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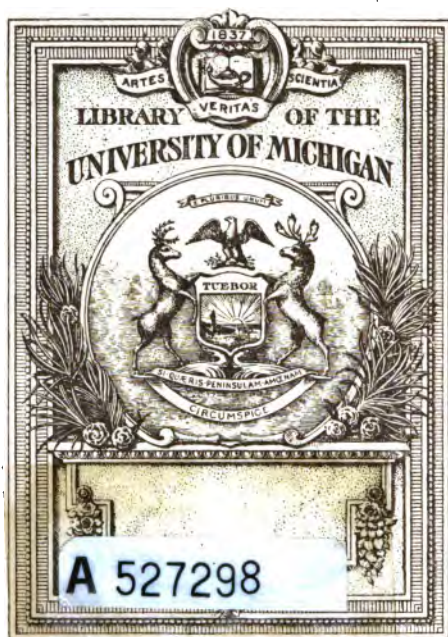
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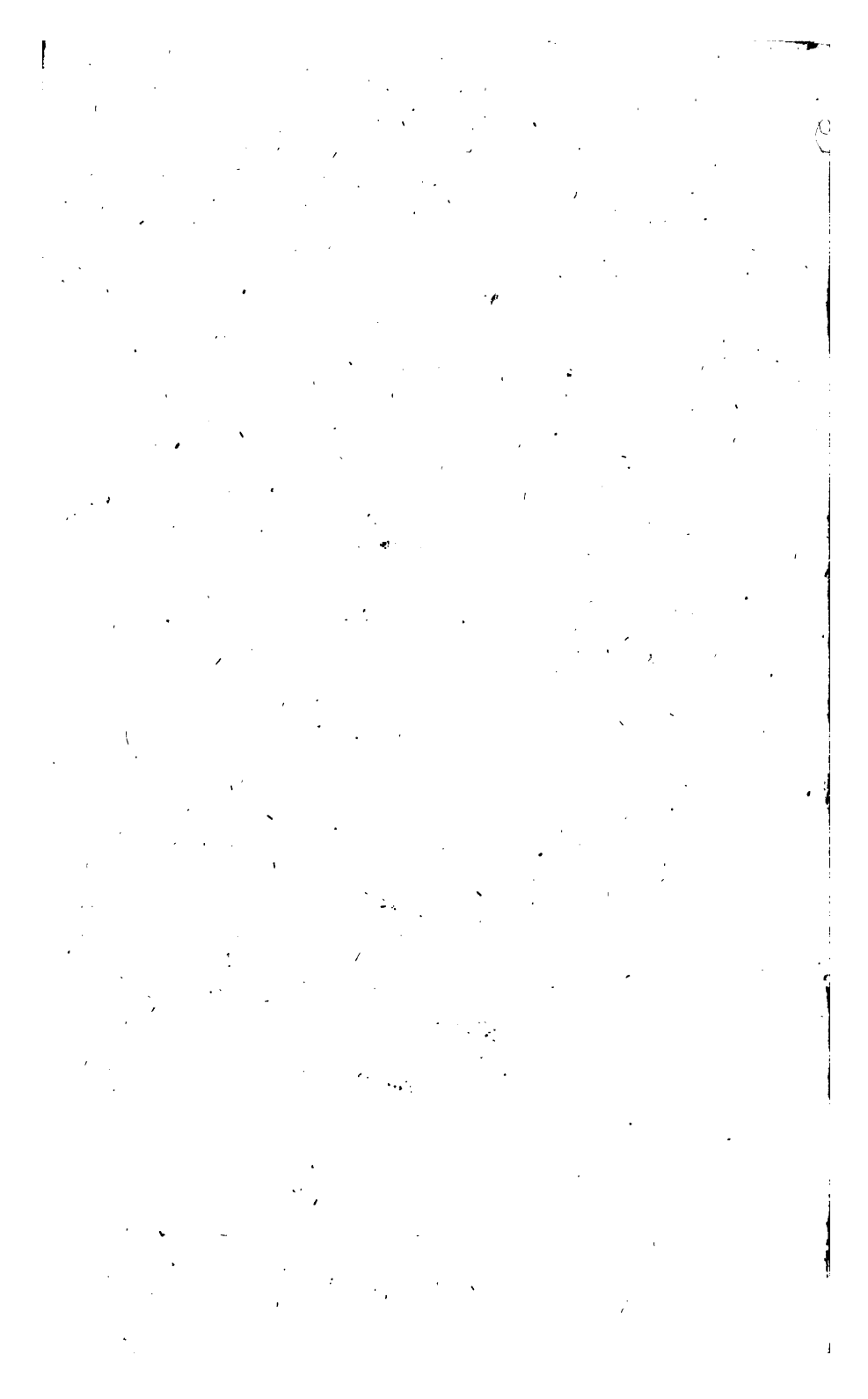
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Contents

	Page		Page
Acacia.....	99	Hornbeam.....	63
Alber.....	124	Holly.....	209
Arborvitae.....	194	Flex.....	199
Arbutus.....	236	Indar tree.....	134
Ash.....	51	Laburnum.....	121
Bay.....	231	Lageros.....	269
Beech.....	22	Larix.....	86
Birch.....	126	Lime.....	57
Cedar.....	176	Lok.....	117
Chenut.....	75	Laurel.....	225
D. Horse.....	83	Maple.....	32
Cherry Wild.....	103	Oak.....	38
D. Bird.....	107	Pine.....	150
Cork tree.....	205	Plane.....	27
Cypress.....	188	Poplar.....	109
Elder.....	141	removing &c.....	308
Elm.....	1	Service.....	130
Fir.....	163	Tacamahaca.....	149
Forests &c.....	294	Thorns.....	242
Grafting &c.....	285	Tulip.....	99
Hints &c.....	272	Walnut.....	67
		Yew.....	220

Sam. Harris 1789

A

TREATISE ON FOREST-TREES:

CONTAINING,

Not only the best Methods of their CULTURE
hitherto practised, but a Variety of new and
useful DISCOVERIES, the result of many re-
peated Experiments :

AS ALSO,

PLAIN DIRECTIONS for removing most of the valuable
Kinds of FOREST-TREES, to the Height of Thirty
Feet and upwards, with certain Success;

AND,

On the same Principles, (with equal Success) for transplant-
ing HEDGES of sundry Kinds, which will at once resist
Cattle :

TO WHICH ARE ADDED,

DIRECTIONS for the Disposition, Planting, and Culture of
HEDGES, by observing which, they will be handsomer and
stronger Fences in five Years, than they now usually are in ten.

By WILLIAM BOUTCHER, NURSERYMAN,
At COMELY-GARDEN, EDINBURGH.

Who then shall grace, or who improve the soil?

Who plants like BATHURST, or who builds like BOYLE.

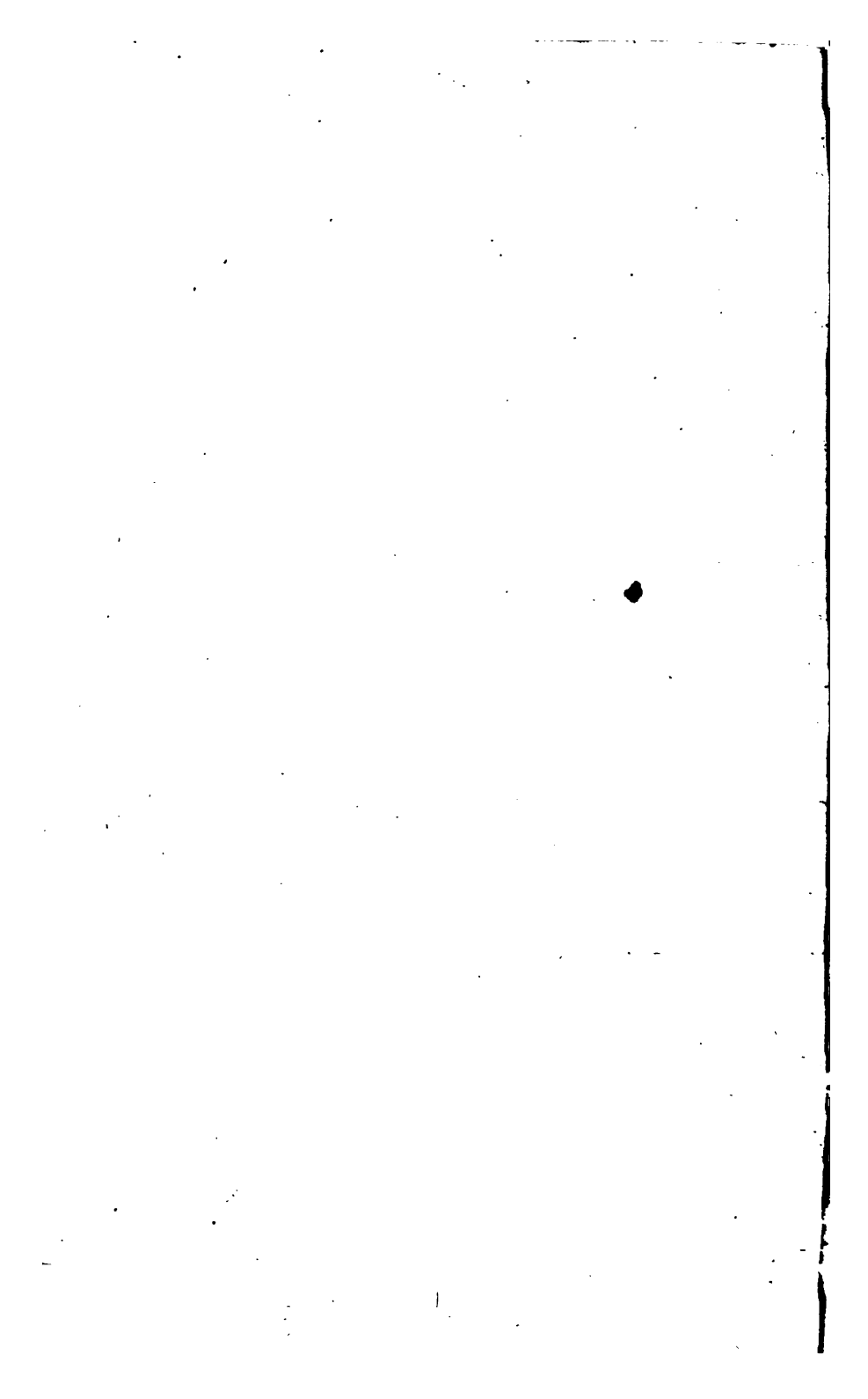
'Tis use alone that sanctifies expence,

And splendor borrows all her rays from sense.

POPE.

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Ms. 1754

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P R E F A C E.

THE number of Pieces that have appeared on Gardening and Planting, and many of them by men of learning and observation, are so numerous, as to render it almost unnecessary, and even presumptuous, to offer any thing new to the public on either one or other of the subjects: But the Author of the following sheets flatters himself, that, on an attentive perusal of the subject he has particularly treated, these impressions will be removed; as the system is far from being exhausted; and as the rules hitherto directed are here extended and improved; with so many new observations, as to render a very considerable part of the work an original performance.

To relate the many pleasures and advantages that attend the skilful practice of Gardening in all its different branches, but particularly in that no less noble than profitable one of Planting, would ill become my humble talents, from the high encomiums bestowed

ed on it by the greatest antient and modern writers. It is sufficient for me to say, it has been the favourite study and amusement of the greatest philosophers, lawgivers, and men eminently attached to the improvement of their country, as well as those who have retired from the busy world to the tranquil state of a rural life, filling up time with the virtuous and innocent employment of planting, and other country entertainments; or the more extensive designs of laying out of ground in the modern taste, or extending to it rides for prospect and pleasure, so strikingly marked by that rural deity the late Mr. Shenstone, in his rural elegance.

And sure there seem, of human kind,
 Some born to shun the solemn strife;
 Some for amusive tasks design'd,
 To soothe the certain ills of life;
 Grace its lone vales with many a budding rose,
 New founts of bliss disclose,
 Call forth refreshing shades, and decorate repose.

No Piece can be more improving or give greater assistance in this way, than what the late Mr. Wheatly has obliged the world with in his two Pieces, an Essay on Design in Gardening, and his Observations on Modern Gardening, having adapted his directions suitable to the form of the ground, whether plain, or advantageously formed with rising swells, or partaking of both, not neglecting to guide the
 purling

P R E F A C E. v

purling stream, or how to manage the rougher grounds.

The Books hitherto published on the culture of Forest Trees, have done little more than vary the directions for a practice that has unhappily prevailed amongst the greater number of inexperienced planters, whose views extended no farther than to set the young tree in the ground, which as soon as they had accomplished, supposed their labour and attention was to rest there. They with the highest justice may be compared to those unnatural parents, who neglect to tend and foster their infant offspring, since from experience we find, that the vegetative tribe, as well as the animate, require both food and attention to rear them to strength, maturity, and good order. The authors alluded to extend their directions no farther than sowing the seed, planting the cuttings, or laying down the branches from the mother tree, in their proper seasons, there to remain for a certain time, and from thence to be transplanted to the nursery, there to be kept for three or four years, and then moved to the places where they are meant to remain for good; and here the business according to their directions is to end. What is now offered to the public is much more extensive, containing directions not only to propagate the plants in a variety of ways, but the culture their different ages

require, both for increasing them in size as well as to form the beauty of their figure, giving the most pleasurable hopes when transplanted, whether to ornament the pleasure ground, the park, or the more extended improvements; collected from practice and observation, as well in Great Britain as in my native country; my practice has been studiously bent to establish certain methods for the removal of trees to the height of *thirty feet* or upwards, and with no less success than the smallest, and this by a previous culture and management not hitherto practised, by which the most valuable deciduous Forest Trees will advance in growth, as well as those planted when young; by this method the expence of staking is avoided, and they will resist the most impetuous winds, the greatest enemy of new-planted trees raised and managed in the common way.

By the process which is pursued in this treatise, trees may be planted with the most certain success, and without any sensible check to their growth, during all the summer months, without any additional expence, further than two or three extraordinary waterings. This circumstance alone ought surely to be of much consideration in this climate, (Scotland), as our grounds in winter are usually so much locked up with frost, flooded with rains, or the weather otherwise so in-
temperate,

temperate, that our planting season is confined to a small part of the spring and autumn. I should likewise imagine, that men of fortune, who spend the winters in the country, could hardly be more agreeably entertained, during the milder season, than, as it were, creating (if I may be allowed the phrase) verdant groves, spacious avenues, or pruning the ground for timber.

Nor is this plan confined to deciduous trees; it extends to many of the best Evergreens, the greatest part of which are generally thought unfit for planting, after they have come to be four, five, or six years old: But the reverse is here made evident, founded on principles collected from practice and experience, Nature's true guide, so that however improbable this practice has hitherto been thought, it may by attending to the directions here given be pursued, and the trees safely removed at the height of eight, ten, and twelve feet, according to their different species.

On the same principles, and with the same advantage, Thorns, and many other plants, may be removed, so as to form immediate fencible hedges that will resist cattle, shelter the ground, and save the expence of ditches, palings, and other fences necessary to protect them when young.

To which is added, *Observations on the best method of planting Hedges, adapted to various soils and situations*, which, for their more ready conception, the different sections are represented in an engraved Copper Plate. Any improvement made on this subject is certainly of great and universal concern to this kingdom. For by not properly attending to this necessary work, but leaving it to ignorant gardeners, or common labourers, much discouragement has been given to inclosing with hedges; and many persons of fortune in this country have, within these few years, bestowed large sums in that way to very little purpose.

Several useful discoveries are also subjoined, on the improvements that may be made by Grafting and Inoculation, on stocks that will enlarge the smaller kinds of plants, and render the tender more hardy.

As inclosing ground with hedges, and raising plantations of Forest-Trees, are the first principles, and most solid foundation for promoting the different branches of husbandry and gardening, and which must be singularly useful to our northern climate in improving, and as it were meliorating it for the more favourably raising of the tender sorts of trees, therefore the greatest encouragement is due from all lovers of their country, to those who shall contribute

tribute to the executing these important points, in a successful and more expeditious manner than is generally practised,—though I am sorry to say, we are less attentive to, and farther behind in the knowledge of the best methods for effecting this, than in most other improvements. We evidently find, that, to procure the quick growth and pleasing figure of our native hardy plants, we must give them the mutual assistance of each other; but how much more necessary must shelter be for rearing the tender foreign sort with any degree of exuberance of growth, is too evident. To this alone, we are indebted for the choicest delicacies of our table, and the more refined pleasure of viewing a vast variety of the most beautiful plants in nature, and notwithstanding the original production of more temperate climates, flourishing in our open air.

Since a good nurseryman can soonest and most effectually procure us such essential advantages and pleasures, I cannot help thinking him, for these and many other reasons, justly intitled to be ranked in the highest class of gardeners; but what we have most to lament is, the few we have amongst us, but which must not long be our situation, from that spirit of planting and improving which almost universally appears through the country. The returns of profit from the nursery are tedious, and to proceed in it to any considerable

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considerable degree, can only be in the power of men of capital, as they must long be out of their money ; the occasion we have so few good nurseries in this kingdom, which is really an object worthy of public consideration as well as encouragement.

From the general bad and insufficient state of nurseries in this kingdom, I cannot help making it known to the public, and particularly to the Honourable Board of Police, to whom Scotland is much indebted for that rapid progress she has made in arts, and the consequence she now holds in the commercial world. It is with the most humble difference I point out to them the line of improvement just mentioned, which we may flatter ourselves will become an object of that truly patriotic body, and which might be executed at no great expence, as an honorary reward would be sufficient, which might be given at the end of four, five, or six years, as they may judge most proper, to the person who shall raise, from the youngest to the largest plantable sizes, the greatest number of the best cultivated Fruit and Forest-trees, Hedge-plants, and other useful nursery articles, in proportion to the extent of land employed for these purposes, and subject to the inspection of a committee of skilful persons appointed by the society to visit the nurseries about Edinburgh, or where else they shall think
them

them worthy of notice in Scotland, either at mid-summer when cloathed with their leaves, or in autumn before the planting season begins,—to inspect the various methods of their culture, and general system of management, —to see specimens of the plants raised, for an examination of their roots, as well as from a just attention to pruning the proportion of their bodies,—and to advertise in the usual way the person most deserving.—This I am persuaded would bring us more forward in the road of general improvement of planting, than from all the writings and examples of the ablest men, or even from any other method that can be devised for the purpose. This would be making a man of real merit in his profession justly conspicuous; it would detect the ignorant pretender. Were this to be our happy situation, every man of abilities would exert himself, both as the means of supporting his reputation, and rendering him conspicuous to gentlemen engaged in improving their estate or domains, and consequently find a very material difference in the quality of even the common plants from their improved culture.

It has been almost an universally received opinion, that trees ought to be raised in the nursery on a poorer soil than that to which they are afterwards to be transplanted for good; and this has been directed by many of
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the most respectable writers. I must acknowledge this doctrine has a very specious appearance at first view : I followed it early in life, and as seemingly a consistent practice, nor was I singular in this, as the same had been pursued by many young planters ; but how it happens that the fallacy has not been until now exploded, I am not able to account, as the contrary has been long since discovered by those attentive to their profession.

In the following sheets I have given some examples, from frequent and repeated experiments, of the ill effects I have discovered from planting young and tender seedlings in the poorest soils, and the greater success attending those that were well-grown, on the same, or in similar situations. The consequences of raising plants in a poor hungry ground, are no less fatal than planting the seedlings in such, and should as much as possible be avoided. In the culture directed for different trees, the necessity of promoting very early their vigorous growth is asserted, in order to their becoming stately and handsome plants ; as it cannot be effected by any other means, than being early nursed in a generous soil, for whatever future purposes they are intended, or to whatever situations they are destined ; and that if they are but barely supported from infancy on poor ground, they will never afterwards become strong, though removed to that
which

which is rich and feeding. The causes for this, will be evident upon an enquiry and easily demonstrated: From their harsh and unfriendly food they contract diseases, which, if not immediately mortal, are certainly incurable ; they necessarily have bad roots, they are hide-bound, and their branches weak and crooked ; in short, though they may long languish in the state of bushes, they will never arrive to the magnitude of what may be properly called trees.

But though I have directed trees to be raised on good land, let it be understood, I mean that only which is naturally so, and not what has been forced and pampered with dung, or at least before that dung has been mellowed and reduced to the consistence of earth, such being yet more baneful to trees in general, than even the poorest soils.

As I have in the course of my directions for the culture of the different trees, pointed out the soil that best agrees, I shall not attempt any thing of that sort here, but mention in general, that the most desirable soil for a nursery, is that which is loose and dry, reduced to the smallest particles by frequent digging and raking ; that which is most to be avoided is what approaches nearest to a heavy moist clay, wherein trees will neither root liberally, nor will our usual winter and spring weather

weather admit of being cultivated, but at particular, and frequently too late periods ; hence it is impossible, that business can be carried on seasonably, to any considerable extent, in such grounds.

I am not insensible of the ineffectual attempts that have been made to transplant large trees, and how much it is considered as impracticable, owing to a total ignorance of the process, which I have given in this treatise, in which will be found the former errors corrected, and a rational system given, founded on nature, and confirmed by experience.

Large trees raised and cultivated agreeable to these directions, so far from not succeeding as well as those planted when young, will grow much more freely, from their greater abundance of roots spreading near the surface, and enjoying all the benefits of the heavenly influences, than such whose roots, being deeper, are struggling with a cold, inactive, and inanimated soil.

When a plantation is made of young trees, the trouble and attention attending it can only be said to be begun, but these made of trees that are above the size of being injured by cattle, and reduced to their proper form by different prunings, require little or no further attention ; and immediately affording that
pleasure,

pleasure, which the former practice we twenty years would be in acquiring.

The process I have here recommended, will enable such as are above the regard of common expence, to have plantations of well-grown trees in one season, as the principles on which the whole of the plan proceeds are infallibly certain, and have stood the test of several trials, and the success, a most substantial pleasure.

However some may recommend their pieces for originality, I shall be contented to rank my labours in a more humble walk, acknowledging a tribute of gratitude to those whose labours I have advantaged by, and whose hints I have improved upon, and laboured to frame into rational and practical systems, which I have ever considered as doing more real service to those for whom I write, than to lead them into a labyrinth of difficulties and speculations.

I should be unworthy the patronage that has been so liberally given me, in that very noble and honourable list of subscribers, that appear to countenance and reward my labours; which I will not attempt to attribute to my fame or the value of my treatise, but to a more pleasing prospect, of a general design of improvement in my country, as for
her

xvi P R E F A C E.

her I feel more than for myself; this disposition within these few years, has made a most rapid progress, and rising in many places with a peculiar splendor, as well for arts, agriculture, and manufactures, the husbandry we are now pursuing, will in a few years bring as forward, and render this kingdom respectable in a science always patronised by the great and encouraged by the judicious, affording employment for the industrious, and plenty to the state.

A T R E A-

TREATISE ON FOREST-TREES.

CHAPTER I. THE ELM TREE.

A Description of its Flower and Seed.

The flower has a rough permanent empalement of one leaf, cut at the rim into five points, and coloured within; it has no petals, but has five awl-shaped stamina, twice the length of the empalement, terminated by short erect summits, having four furrows, and an orbicular erect germin, supporting two styles which are reflexed, and crowned by hairy stigmas. The germin afterward turns to a roundish, compassed, bordered capsule, including one roundish compassed seed.

The SPECIES are:

1. The small-leaved or true ENGLISH ELM;
2. The ENGLISH ELM with large rough leaves;
3. The FRENCH ELM;
4. The rough-barked DUTCH ELM;
5. The CORNISH ELM;
6. The

6. The RED ELM from CANADA ;
7. The SCOTCH ELM in England, called the WITCH ELM ;
8. The ENGLISH ELM with striped leaves.

THE five sorts first mentioned are propagated by layers or suckers, the former of which is by much the best method, as the trees, so raised, will, in their first stages, advance more in growth, and make handsomer plants than those taken from the roots of old trees; neither will they so soon, or in so great a number, produce suckers, which retard the growth of the tree. I shall therefore first describe the manner of raising those kinds in that way, and proceed to the best methods of their culture, from the mother, till they arrive to the height of thirty feet or upwards.

Having prepared a spot of ground, neither too light and thin, nor too moist and heavy, but fresh and mellow; that has been well trenched the preceding year, from which all weeds and stones have been carefully picked out, and that has been a year or two employed in leafy kitchen-garden crops; let it be well dug, and levelled the beginning of October: Then provide yourself with stools, or mother-plants; let them be such as have stood seven years, and were cut down the fifth; the stools being now of two years growth, are to be cut down to the length of two or three inches; the stools are then to be raised and planted at eight feet distance in the Quincunx order, and should the situation not incline to moisture, let each be planted in a hollow formed like a basin, the better to retain the advantages of descending rains and dews; at planting give them a gentle watering, to settle the earth about their roots.

If

If you cannot procure such as have been cut with a view for rearing mother-plants, choose from the nursery such sound, vigorous trees, as are of about six or seven years growth; and if they have been twice or thrice transplanted, so much the better, for, by having abundance of roots, they will produce plenty of strong sound branches: Cut them flanting, to about eighteen inches or two feet above ground; then make a trench long enough to receive them lying on their sides, sloping so as their roots may be covered six or seven inches, leaving no more than three or four inches of their tops to appear above the surface; let the wounded parts, which ought to be cut very clean and smooth, incline to the surface, to prevent their being injured by the winter rains; lay them at eight feet distance one from the other, and water them to settle the earth about them, keep them clear of weeds, frequently stirring and loosening the earth about them, so as to receive the full benefit of the summer rains and dews. If the ground is of a good quality, and the season favourable, many of them will be fit to lay the following October; and such shoots as are too weak for laying then, being again cut, will produce sufficient to furnish the ground with a full crop of layers the succeeding autumn.

As early in October as the weather will permit, begin laying your Elms, giving them a gentle watering, which, in dry weather, should be frequently repeated during the summer months; the expence whereof will be amply repaid by the well-rooting and strength of your layers. The method of performing this operation on different trees, will be directed in a chapter selected for the purpose, to avoid repetition.

The following October, if the branches have been skillfully laid, and the ground managed as directed, most of the layers will be sufficiently rooted; when, having prepared a spot of good mel-
low ground, as for the stools, carefully uncover the plants, whose fibres are at this time extremely tender; raise them gently with the spade, and with a sharp knife cut them at the extremity of their roots, and such of them as have not pushed out fibres at the joint where they were laid, but are what the gardeners call *club-rooted*, should be thrown away, as they will never make good plants, or resist the winds: Having separated them from the mother tree, trim away such of the small hairy fibres that are bruised and broken, as they are apt to mould, and endanger the tree; but be very sparing of what is fresh and sound, shortening them and the principal roots but moderately, tho' many fashionable gardeners make a little too free in this point, by cutting most of them away, endeavouring to show their address, by making trees grow without them; keep them out of the ground as little time as possible; cut them down to about a foot in height, and plant them in lines three feet asunder, and eighteen inches apart in the lines. Here let them remain two seasons, when they are again to be cut down, in the beginning of March, within two or three inches of the surface: By this time the plants will be well rooted, and, the succeeding summer, in a good soil and temperate season, they will produce straight clean shoots, four and five feet high. In March following, prune away all strong lateral and ill-placed branches close to the stem, but leave several of the smaller shoots, more or less as the plants are thick or slender bodied, to detain the sap, and augment their trunks; this not being properly attended to, is
the

FOREST TREES.

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The occasion of many trees growing, with ill proportioned trunks, to great heights, that is, with slender bodies and heavy tops, unable to support themselves; but bending almost to the ground with every gust of wind, and of course, never can arrive to that magnitude or beauty, we would wish to see them. Here these trees may remain another year, when, if they are intended to be made fit for transplanting at a large size, they must be removed to another nursery, and planted at greater distances. But before I proceed to that, I shall direct their culture from suckers, and from the seed of the Scotch Elm, until they are fit to be treated in the same manner as those just directed, the same management answering the different kinds. It may here be necessary to observe, after having cut down your Elms, or indeed any other tree, that, as soon as the young shoots appear, you should rub off all but the most promising, which will much advance their growth.

Being provided in the spring, when the sap begins to rise, with suckers grubbed up from the roots of old trees, which are preferable to the autumnal shoots; cut off all the bruised and broken roots, trim the shoots to about six or eight inches high; lay them in drills cut out with the spade, eighteen inches line from line, and eight or nine inches in the line; give them a gentle watering, and keep the ground clean and loose about them: Having stood here one year, cut them down to the ground, there to remain another; when they ought to be raised and planted in a separate nursery, at double the former distance. Such of them as have made strong shoots, and thick in proportion to their height, may be planted without shortening; but such as are dwarfish and ill-formed, or out of proportion, must be

shortened again, more or less as they have good or bad roots; those with good roots to be less reduced in their height than the others, which ought to be an invariable rule in the pruning all sorts of Forest-Trees; In this situation, let them remain two, but not to exceed three years, managing them in all respects as the layers.

The Canada Elm having been lately imported into Britain, they are not yet arrived to any magnitude with us, but in their native soil they grow to a vast size. I have only cultivated them within these last three years, during which time they have considerably exceeded in growth all the other different species of Elms, and there is a very promising appearance that they will soon become stately trees in this climate (Scotland). I have with ease increased them from layers, and they root more abundantly that way than the English Elm. I have also successfully grafted them on English, Scotch, and Dutch stocks, and the most vigorous shoots have been from the Dutch, though these on the English seem to have a more elegant form: Their leaves are broader than those of the Scotch or Dutch Elm, but smoother, and of a more lively green; from which circumstance, they seem to claim our encouragement. These trees produce plenty of seed in Canada, from whence they may be easily procured; but from the length of the voyage, and the delicacy of the seed, they seldom arrive sufficiently fresh in Britain; Therefore, the readiest way to cultivate them here, is from layers, or by grafting; and such plants perhaps will be hardier than those raised from foreign seed.

The Scotch Elm may be propagated by layers, with the same advantage as the other sorts, and will produce

FOREST-TREES.

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produce abundance of roots with greater facility, and in coarser land, than the English; but as they generally yield abundance of seed, and great numbers may be wanted, I shall direct their culture, and more particularly, as it is the cheapest way of raising them;

The seed of this tree commonly ripen from the beginning until the middle of June, as the season is more or less forward; It is easy to discover their ripeness by the husk being full and firm, inclining to a tawny brown colour. The seed must be attentively looked over, as they approach to maturity; for when they are fully ripe, a blast of wind, or a heavy shower will disperse them, as I have frequently experienced, when it will be difficult to gather any quantity of them, the seed being very small, and totally impossible where the ground is under grass, or of an uneven surface; but what I would recommend, is, as soon as the gathering season arrives, is to make choice of one of the most fair looking trees, into which let a man mount to shake the branches, first spreading a sheet under it. By this practice, you will have no other but the most generous full ripened seed, a circumstance of no mean consideration in your future success, whereas, in the common way of sweeping the seed from the ground, there is always gathered abundance of chaff, with much weak and unripened seed.

The common practice is to sow the seed a few days after gathering, by which means a number of them will rise in four, or five weeks, but these coming up in the very warm season, and not having a sufficient continuance of it, to make them strong plants before the hard weather comes on, are commonly forced out of the ground by the

winter frosts; but should the winter prove uncommonly mild, so that they stand it out, yet they will be weak and stunted, and hardly ever make handsome free growing trees; and though the most part of the seed will not appear until the following spring, yet, from the ground being hard and battered with the winter rains, they will make but poor shoots, compared to those that are raised in the spring on a well-prepared soil. It is therefore by the latter management, that you can expect to raise vigorous and healthful plants, not only of these but of any other kinds; and it is but lost labour to attempt to recover such as have been starved and stunted, as they can never be formed into pleasing trees. For these reasons, I shall not pay any regard to common rules, however prevailing, further than I have found them to succeed in practice. What I shall lay down far to be followed, is what I have experienced in my practice, and by which I have raised this very valuable tree, to a surprising size in a few years.

As soon as the seed is gathered, spread them on canvass in the open air, but not exposed to a warm sun, as it would dry them too fast, and exhale their vegetative juices; turn them over frequently, separating the clusters for the readier drying, which will prevent their growing musty; let the seed be placed under cover in the night, to protect them from rain and the dews, which care must be continued as the weather proves temperate and clear, or damp and cloudy, but in the general it will require ten or twelve days of seasonable weather to prepare them for keeping. After this, the seed are to be put into bags, but not pressed down, and laid in the seed-loft, there to remain five or six weeks, by which time they will become dry and firm, without having lost any
of

of their vegetative quality, and the growing season being near over, they will be in no danger of springing too early. From the seed-loft let the seed be removed to any covered shady place in the nursery, mixing them with one-third of fine sand to two of seed, covering the whole four inches thick with more sand or fine loose sifted earth, to prevent any injury from the frost; and in this state to remain until the following February.

About the 12th of that month, or as soon as the weather will permit, prepare a spot of loose rich garden earth, made perfectly clear of weeds, to be finely raked. Divide this plot into beds of three and a half feet wide, with alleys of eighteen inches: Move off a little of the earth with the head of the rake, as is practised in sowing onions, and other small kitchen crops; then sow the seed moderately thin, (thick sowing being an almost universal though capital error in this and most kinds of tree-seeds); press the seed gently into the bed with the back of the spade, this will leave a smooth level surface, which will be easily covered, on which draw over the earth that has been moved off the bed, as first directed, throwing on a little more from the alleys, until the seed is covered to the depth of half an inch, but not more, deep covering being one of the many errors I have to correct.

The beginning of April, the seed will appear above ground; when, should the weather prove dry, and not frosty, the seedlings are to be refreshed with frequent, but very gentle waterings, either in the evening, or early in the morning, and carefully kept clear of weeds, otherwise many of the plants will be lost, and the growth of the remainder much impeded.

Should

Should the seed be sown in a good well-prepared soil, and the season prove favourable, the plants are all to be taken up the following spring; but if the ground should prove unfavourable, and of course the plants small, they must stand another year; however, it will be proper to draw out the largest, otherwise they will so much overshadow the small ones in the summer, as to deprive them of air and moisture, and consequently rob the greatest part of them of their proper nourishment.

The separating of the larger from the smaller plants, in all kinds of nurseries, is of great consequence, both in point of use and beauty, than is generally attended to, as, from this practice, the trees nearly keep pace one with another, which contributes not a little to their preservation, being equally exposed to the vegetative powers. This care I would recommend to be observed and attended to, not only in the nursery, but when trees are planted where they are to remain.

These plants having been carefully raised from the seminary with all their fibres, shorten their top-roots, and commit them to the nursery, the well-grown in October, but the smaller not until February, lest the winter's frost force them out of the ground: Plant the largest in rows two and a half feet asunder, and a foot distance in the row, where they may remain two years, but let the smaller be laid in beds one foot row from row, and about six inches in the row, to stand one year only, when they may be treated as the larger seedlings, and like them to stand two years longer.

The English Elm with striped leaves, may be grafted on any of the Elms, though on the plain English

English they make the handsomest plants; but in order to preserve their original variegation, they ought to be planted on a poor light soil, as in deep rich ground they lose much of that beauty, and sometimes turn quite plain, though the most effectual method I have ever found, for preserving the colours of this and many other striped plants, is to propagate them from layers of trees that are richest in their variegation, which will be acting with the greater certainty, than to use such as have been grafted on plain stocks.

Beside the common method of raising Elms from layers, suckers and seed, there are many propagated, by grafting and inoculating the English kind on Scotch stocks. For certain soils and situations, this is a very great improvement; but where that is not judiciously considered, it may have a very opposite effect: I shall therefore (having tried many experiments on this favourite tree) be particular in pointing out the advantages, or disadvantages, of propagating the English Elm by grafting, and adapting the stocks on which they are to be grafted to the soils where they are to be planted, which will prove not less pleasing than profitable.

Where the soil is dry, sound, and generous, and the climate good, there is not any species of the Elm yet familiar to us, equal in beauty to the true small-leaved English, from layers of its own kind; nor has it any fault, but being unkindly to root (when unskilfully laid), and in stormy situations reclining from the wind; but, by the present system of culture, these defects will be entirely remedied, and it will root as freely as the Scotch Elm, or any other tree, and resist the most impetuous winds equally well.

Next

Next to the true English, I esteem the Cornish Elm as the finest tree of this tribe, both for loftiness of growth; elegance of form; and the lively chearful verdure of its leaves.

The English Elm grafted on the Scotch makes both a beautiful and a valuable tree, yet it is still inferior in regularity of form, and loftiness of stature, to those raised from their own mother; and as every tree must in some measure partake of the stock on which it is grafted, so this has a near resemblance of the Scotch Elm in its bark even when young, and when old, like them, grows more loose, spreading, and less erect than the true English, though, when young, they are extremely beautiful.

Where the land is tolerably deep, though coarse, and inclined to clay or till, those on Scotch stocks will succeed better than the English on its own bottom; but where the ground is thin and hungry, it is in vain to plant them.

On moist, heavy, coarse, and even wet lands, that have any competent degree of strength, plant the rough Dutch Elm; and in such situations, I have even raised thriving plantations of the English, grafted on their stocks, which made a fairer tree than those on the Scotch stock, and has a nearer resemblance of the true English, than the Dutch Elm has. At the same time, though this plant most generally affects a deep soil, I have seen many of them, and very stately trees, growing on burning sand and gravel.

The French Elm delights in a deep rich moist earth, where they will make amazing progress, and become beautiful trees. But for such a situation, should

should the English Elm be chosen, graft them on stocks of the French, as they make the finest plants of the whole tribe, the English on its own stem excepted, and which has no competitor, when suited to its proper soil.

The French Elm may also be much improved, by grafting it on the English, when they can be planted in such soil as is directed for them.

Here it may not be unnecessary to observe a practice extremely common amongst ignorant nurserymen, which is, cutting their English Elm grafts from those on Scotch stocks, and which indeed have the fairest and plumpest buds, (a plain indication from whence they immediately proceed, the buds of the Scotch being larger and more turgid than those of the English) but these gentlemen either do not regard the quality of the plant, or are ignorant, that, by repeating this practice, the English Elm may be brought so far to degenerate, by repeated graftings, as to differ very little from the Scotch; therefore, whatever kind the stocks are of, on which you graft the English, let the grafts be taken from trees of the true kind, raised by layers from their own mother. That this is but little attended to, many gentlemen from frequent disappointments can testify.

It may also be proper here to notice, that all Elms planted in gardens, and by the sides of walks, lawns, or avenues, ought to be on Scotch stocks, as these produce no suckers, which the English, French, and Dutch do, and in such abundance, as to create a great deal of trouble and expense to keep such places clear of them, and in good order.

I am

I am well aware that the ignorant part of my profession (whom I hope are not the majority) will say, here is a great deal of time, land, and labour lost, in cutting down trees before they are ready for sale, or at any rate, which had they remained uncut, would have been larger in the time, and consequently higher priced. According to the common practice, where ignorance and dishonesty go hand in hand, it will be difficult to convince such men of their real interest, which they perhaps believe consists in getting money by whatever means they may, without any regard to credit. Such will not easily relinquish their former ill-habits, or reflect, that a person of taste and knowledge in gardening would cheerfully reward their patience and industry, by readily paying a higher price for a handsome vigorous plant, and on which they could have a reliance for success, than for one that was as unshapely in its appearance, as unpromising for growing. To such therefore I do not mean to address myself, but to those of more liberal sentiments. I will boldly affirm, that though a little more land and labour is bestowed, there is in the end no time lost, but much anticipated by this operation, as, in four or five years, the trees cut down will be considerably larger than those that have been otherwise treated, with this further desirable circumstance, that, instead of being ragged, unsightly, and ill-rooted, they will be straight and clean-skinned, with a much greater abundance of roots. In short, cutting down the trees establishes their growth, by diverting the sap to the root, frees them from many injuries, and by being well rooted, are enabled to withstand our winds, and produce handsome and generous shoots, infinitely preferable to such as are abandoned to nature, and accident without this discipline; and when
seasonably

seasonably practised, nothing will so much accelerate the success of plantations, and give many years in advance, not more in this tree than in many others, as has been experienced by many lovers of improvement, not only here, but in a neighbouring kingdom, whose climate nearly resembles our own; of which every gentleman must be convinced, (however they may not at first be satisfied) who have seen a Piece entitled, *Some Hints on Planting*, by a Planter, published at Newry, in Ireland, whose Author I am satisfied is a real friend to his country, from the pains he has taken for its improvement.

Thus having directed the best methods of treating these plants in their early stages, and which indeed is all the culture commonly bestowed on them, for whatever purposes they are designed, or at whatever sizes to be removed: I proceed to their management for a succession of years, with a view to their being transplanted when large trees, and which, by observing the rules here laid down, they may be, with the most certain success, to any size, capable of being raised and moved.

These trees, if planted in a good soil, having now arrived to the height of six or seven feet, the same practice will answer for the different sorts of Elms.

Your ground being prepared by a good digging, which on this occasion I prefer to trenching, (as a deep loose soil would invite the roots downward, whereas the present system requires their spreading as much as possible near the surface), raise your plants carefully, with all their hairy roots and fibres; reduce the downright roots considerably, but only smooth

smooth with a sharp knife the extremities of those that spread themselves; observe that whatever earth adheres to the fibres, (if the distance of their new quarters is near,) should be preserved, cutting away some of the smallest straggling hairy parts; for roots are the conduits by which nourishment is conveyed, and transfused to all parts of the tree. The roots thus prepared; cut away close to the trunk all ill-placed straggling branches, leaving only a few of the smallest, to detain (as has been already directed) the sap for the nourishment of the trunk of the tree. Plant them in lines four feet asunder, and eighteen inches in the line; let them be watered, to settle the earth about their roots, and in this situation they must remain two years, which I would not exceed.

From this nursery remove them to another, dressing their roots and bodies as at last removal; and plant them in lines five feet asunder, and two feet in the line, where they may remain for three years more.

Let them be again removed, and planted in lines eight feet asunder, and six feet in the line, in which situation continue them four years; let these have a plentiful watering, and observe that the waterings be increased in proportion to the age and size of the tree.

The ground between the lines, from first to last, ought to be well dug every spring and autumn, which will much increase the number, and promote the spreading of the roots, and of course the growth of the plants.

The

The trees being now twelve years old, will be from twenty to twenty-four feet high, and being raised in a good soil, may be planted out where they are to remain for good, or removed to the fields, or any spot of good land most convenient, and planted at least ten feet asunder, to be ready for whatever design may be in view, or should afterwards occur; whence, any time from three to seven or eight years, they may not only be removed with undoubted success, but with such abundance of earth adhering to their shaggy roots; and with such strength and proportion of body, as to defy the rudest assaults of the winds, even at first planting, without staking or any other support; which, though an almost universal practice, is, notwithstanding, the result of ignorance, and is only necessary to support the defect of good culture, by proping trees that have been injudiciously managed, as none of the straight growing pyramidical trees (the deciduous kinds more particularly) have the least want of that aid, if the directions here given are attended to.

Every gardener, of the smallest observation, must be sensible, that the rotting of the wounded parts of old trees, is the most general cause of their dying; but in the practice I have just recommended, no violence is offered, no amputation made, but on the young and tender roots and branches, which immediately heal; from hence nature points out, that this process may be continued (particularly with the Elm) while it continues fresh and vigorous, without retarding its growth in any material degree.

That I have been very liberal, if not extravagant, in ground, by the distances allowed the plants, and that few nurserymen have such an extent as to en-

able them to proceed deeply in this plan, is a reflection I am satisfied will be made by numbers; but that I have not exceeded the proper bounds, long experience has convinced me, as it will others who make the experiment as fairly as I have done: But if my assertion should not be thought sufficient without another reason, I shall give one that I hope will be sufficiently convincing, which is, by making proper use of the vacancies, when the present system may turn out even frugal. The trees, till they are six or seven feet high, are allowed no greater distance than every ingenious nurseryman will admit to be a proper medium; after which, when the trees are placed in the increased distances, they are annually pruned, which gives room for crops of Turnips, Onions, Leeks, Carrots, Beans, Cabbages, Collyflowers, and a variety of garden herbs, without the smallest injury to the trees; particularly the early crops, from which I have had frequent profitable returns; particularly early turnips, and other tender roots and greens, in severe springs, when they have been totally cut off in the open quarters of the garden; from which circumstance it is evident, that trees planted at considerable distances, and their superfluous branches pruned off, may be cultivated at a much less expence than at first apprehended.

If the land is thin and hungry, or of a cold tilly clay, on which you intend to plant the English Elm, the common method of making pits for them, is but lost labour. In such soils the Dutch only will succeed, where it is amazing with how many difficulties it will struggle, and soon become a large tree. But in these unfriendly situations, the English must be courted (as well it deserves) to display its beauty.

To

FOREST - TREES. 19

To effect this, I know but one certain method, which is, to plant on the surface, or as much above it as you can afford soil, and raise mounds of good earth, sufficient to cover the roots and establish the tree; which, being thus fed, until it acquire its former strength and hardiness, will afterwards put up with coarser fare. Besides, the trees thus propagated, will not incline to run downwards, as those planted young ever do, but will spread their roots near the surface, within the influence of the sun's rays, and accumulate all the good nourishment the place affords. This elevation of the trees, has a very pleasing effect in parks, clumps, and lawns.

Tho' I have mentioned particular waterings, it may not be amiss, in general; to observe, that all large trees must be watered at transplanting: If in October, once will be sufficient until spring; from which time, it should be continued every month until August, at least in dry weather, or rather when it does not rain plentifully; but these planted in the spring, will require more frequent and abundant waterings than the others. I would not however have it understood, that the directions for giving large proportions of water to the large trees at planting, should be followed when planting out the younger sorts; though to them it should be given frequently indeed, but sparingly, as over-watering of young trees, is generally more destructive, than quite neglecting them: Let it also be an established principle, that, from once beginning to water seedlings, or other small and delicate plants, you must regularly continue it, as the weather requires, otherwise you will do more harm than good.

I shall say no more on the culture of this noble, beautiful, and useful tree, which well deserves your utmost care and attention to bring it to perfection, and for which it will amply repay you, both in pleasure and profit; therefore, I again recommend, that, at all the different removals, but particularly the latter, to preserve the earth that adheres to the roots, in order to accelerate their pushing out new fibres; for, not being as yet naturalized to the new soil, it cannot be expected to grow with the same vigour; wherefore I would recommend an addition of this soil, as the best means in your power of repairing their loss, and as it were to reconcile them to their new, and perhaps more unfavourable situation.

I have been not a little surprised, to find that some authors of reputation have pronounced the French and Dutch Elms, as trees of no value, either for use or improvements; and which I cannot account for in any other way, than their having mistaken some other species for these trees. It was early in life that I began my observations; and the Elm being a favourite with me, I was determined to be satisfied in that particular, therefore I sent both to France and Holland, for the different kinds, getting the French from Paris, and the Dutch from Rotterdam, which were the mother-plants of such as I have since raised of these kinds. The French Elm, planted in such soil as has been directed, makes a beautiful tree; it grows fast, and the wood, though not quite so hard as that of the English or Scotch, is yet a valuable timber, and not much inferior to them. The Dutch Elm, tho' inferior in beauty and elegance of form, is, notwithstanding, a very valuable tree, particularly in this climate, (Scotland,) it ought
to

to be highly cherished, and much made use of by us, as it succeeds in wet obstinate clay land, where no tree I know of equal use, except a few aquatics, will grow freely, and soon become a stately tree; and though the wood is not equal to the other kinds, it is still an useful wood, and purchased by the carpenter.

In Scotland, the dealers in timber are partial, or ignorant with regard to the Scotch Elm, giving it a preference to the English: But to this, it is not in the least entitled; for having cut down many of these trees, I weighed a cubic foot of the one and the other, cut at the same time, and always found the English the closest and most ponderous.

I have sold about sixty English Elms, at twenty-four years growth, of my own raising, at a guinea each, and these not selected but taken in the line: They were in general of about eighteen inches diameter, a foot above the ground, and forty feet high.

C H A P T E R I I .

T H E B E E C H T R E E .

A Description of its Flower and Seed.

It hath male and female flowers on the same tree; the male flowers are collected into globular heads, these have no petals, but have several stamina included in an empalement of one leaf, which are terminated by oblong summits. The female flowers have a one-leaved empalement cut into four parts, but have no petals; the germin is fixed to the empalement, supporting three styles, crowned by reflexed stigmas. The germin afterwards becomes a roundish capsule, armed with soft spines, opening in three cells, each containing a triangular nut.

The S P E C I E S a r e :

1. The common BEECH.
2. The yellow-striped BEECH.
3. The white-striped BEECH.

TH E common method of raising these plants, is, sowing their seed very thick in beds, early in the spring, there to stand two years; or, to draw a part of them the first and second year, and to leave the remainder until they are three years old: Yet this, however general, is a very bad practice, as the plants that are drawn have most of their tender fibres torn away, (an injury they will not soon recover); and what remains, will be carrot-rooted, and suffer much, by the necessity of shortening their roots (then hard and woody) when transplanting

ing them. I shall therefore leave the beaten path, and direct the practice I have found more successful in the culture of this tree, and brings it soonest to perfection.

Being provided with mast gathered in autumn, from the straightest, and most vigorous growing trees, the hulks being quite dry, mix them with sand, and lay them under an old hot-bed frame, or other covering, to protect them from frost and wet. This will prepare the seed for vegetation, and disappoint the mice, who generally have a large share of them, when early sown.

In the beginning of March, sow them thin in shallow drills, about eighteen inches asunder; and if the season is dry, and water at no great distance, give them frequent, but moderate sprinklings, on their beginning to appear above ground, until the middle of August, which will much forward their growth.

About March in the next season, (with a spade made very sharp for the purpose) undermine the roots as they stand in the drills, and cut them to between four and five inches under the surface.

In the following autumn, or spring, you may either raise them, or give them another cutting below the surface, then gently raising such as are too thick, leaves the remainder, at proper distances, to stand another season. This manner of cutting their roots, has, in a great measure, the same effect as transplanting.

Those you have raised, as soon as you have smoothed their bruised and broken roots, and cut away some of the small hairy fibres with a sharp knife, plant in lines two feet asunder, and nine or ten inches in the line; and if the soil is good, and the plants have grown vigorously, they should not remain any longer than two years, but in poor land, they are to continue three.

Those left in the drills where sown, are, next autumn, or the following spring, to be treated in the same manner.

I must here observe a general error in the management of the Beech Tree at this age, which is, trimming off all their side-branches, and planting no more than the bare stem. This is doing the greatest violence to these plants, and of which, they will not for several years get the better; no tree that I know of, admits less of being pruned when transplanted, particularly when young; as from it, (when executed with severity) they become constantly hide-bound and stunted; therefore, none but very ill-placed branches (and even these sparingly) are to be touched at this season.

From this nursery they must be removed to another, and planted in lines three and a half feet asunder, and eighteen inches in the line, where they may remain, if in a good soil, for three years, but in poor land, four; observing always to prune but moderately at each removal, leaving abundance of small branches to draw the sap, for the increase of their trunks.

At this period, these plants will be fit for common and extensive plantations; but such as are designed

signed for removal when large trees, they must undergo some further operations.

These are to be removed to another nursery, and planted in lines five feet asunder, and two feet distance in the line, to remain in good ground three years, but in poor, four.

From this remove them again, and plant them eight feet asunder line from line, and six feet in the line, to remain four years.

From this nursery, if required of a larger size, remove them to the fields, planting them ten feet asunder every way, to be ready for any future designs; and manage them as has been directed for the Elm.

It has been already observed, that no deciduous tree agrees worse than this, with pruning at removal, to which may be added, wounding them, by cutting off large branches; the best method of treating them, is to reduce them to their proper form by regular prunings, while growing in the nursery, particularly the season before they are transplanted: This being regularly observed, and the earth kept in a proper degree of moisture, they will not be sensibly retarded in their future growth.

The sorts with variegated leaves, are propagated by budding them on the common kind.

This valuable tree, for lofty espaliers to keep gardens warm, or for hedge-rows to shelter barren fields, has hardly its equal, and, by retaining its leaves all winter, affords the same protection as an evergreen: It is therefore really amazing it is not
more

more univerfally planted in the cold, bleak, and mountainous parts of the kingdom, where it will grow in the pooreft, ftoney, fandey, and gravelly grounds, and infinuate its roots into places one would think impenetrable to any plant. It is, befides, a tree of great beauty; and though the wood is not fo valuable as that of fome others, yet it is fitting for many ufeul purpofes; and for fuel, it is the beft of any wood we have in this climate.

CHAPTER III.

PLATANUS; or, The PLANE TREE.

A Description of its Flower and Seed.

It hath male and female flowers growing separate on the same tree. The male flowers are collected in a round ball; they have no petals, but have very small empalements, which have oblong coloured stamina, terminated by four cornered summits. The female flowers have small scaly empalements, and several small concave petals, with several awl-shaped germin sitting upon the styles, crowned by recurved stigmas; these are collected in large balls. The germin afterwards turns to a roundish seed sitting upon the bristly style, and surrounded with downy hairs.

The SPECIES are:

1. The true ORIENTAL PLANE.
2. The Maple-leaved or SPANISH PLANE.
3. The Western or VIRGINIAN PLANE.

THE first sort is usually raised from layers, though, where the seed can be had, the plants raised from it make the finest trees.

If to be propagated from layers, let them be laid down the beginning of March, and they will be sufficiently rooted in a year.

If from seed let it be sown the autumn it becomes ripe, in a moist rich soil, and shady situation, but not before it is dry. In the winter, cover the beds with pease-straw, or rotten tanners bark, to be laid

two or three inches deep, or some other light covering that can be easily removed in mild weather, to prevent the ground, (for want of air,) from contracting a mustiness, which might destroy the seed. In the following spring, before the seed vegetates, rake the beds gently over with a short toothed rake, lifting a little rich mould on them, and in proportion to what has been raked off; in dry weather, during the summer months, let them be regularly refreshed with water. The following autumn, the beds having been made quite clean, and loosened with your finger, so as not to disturb the plants, put a little more good mould about them with your hands, after this they will require no further trouble, but to keep them clean until they have another season's growth; by which time, let them be removed to the nursery the succeeding spring.

The second sort, though by many ranked as a distinct species, Mr Miller (and I believe justly) thinks only a feminal variety of the first; notwithstanding the leaves are less divided, but more than the western kind, and is easily increased by layers.

The third sort grows freely from cuttings, which ought to be planted the beginning of March, in shady borders of rich moist earth, two feet line from line, and eight or ten inches in the line; and if they are torn asunder at the joints, with a knob or some bur of the old wood, they will grow more readily, and sooner become strong plants, than otherwise. These cuttings ought to be a foot or fourteen inches in length, buried about eight inches deep, and moderately watered till their shoots are two or three inches long, where they should remain two years. The leaves of this kind are broader, and less

less indented than the other two ; it is likewise hardier, grows faster, and to a greater magnitude in this climate : So that in large plantations, or in exposed situations, I would advise the greatest number of them to be planted.

The seedlings, layers, and cuttings, are now all to be treated in the same manner, and planted out in the nursery, in lines three feet and a half asunder, and eighteen inches distant in the line : Let them get a plentiful watering at removal ; cut away the extremities of their roots, with all ill-placed over-crowded branches, there to remain for three years.

From this remove them to another nursery, and plant them in lines six feet asunder, and three feet in the line, where they may stand six or seven years without removal, as this tree naturally produces abundance of roots with little culture. In this nursery let the ground be annually dug ; as for other plants, and the trees regularly pruned to the form you would have them : By attending to this, as soon as you have planted them out for good, your labour is almost over, as they will require little or no pruning ever after, but advance in a regular and beautiful manner, without the assistance of art.

The proper season for transplanting this tree is in the month of March, and during the summer months, if the season is dry, they ought to be plentifully watered, particularly if the soil is light and thin ; for though this is a very hardy plant, yet, by removing them in autumn or winter, (should the season prove very severe,) the extremities of the preceding summer's shoot are sometimes blasted, which

which gives them an unpleasing appearance the year following.

The *Platanus* will grow in any tolerable soil, but they naturally delight in a moist deep ground; therefore, when they are planted on that of an opposite quality, they should be plentifully watered for several summers, which they will gratefully acknowledge, by the luxuriance of their growth.

This beautiful and magnificent tree is said to have been first introduced into England by the great Lord Chancellor Bacon, who planted a great number of them at Verulam, near London, which were very flourishing a few years since. The great esteem the ancient Persians, Asiatics, Greeks, and Romans, (who brought it from the Levant) had for it, is recorded by many historians, and that the salubrious emissions from the plantations they made near the city, protected them from the plague, and particularly at Ispahan in Persia, where it had for many centuries made dreadful ravages. The story of Xerxes halting his army of seventeen hundred thousand men for some days, when on his march to invade Greece, to admire the beauty and magnitude of one of these venerable Trees, is well known; as is that of the Romans moistening them with wine instead of water. But a relation at large of these, and other like circumstances, would exceed our bounds, and be unnecessary in a work of this kind: It is therefore sufficient to observe, that the high esteem in which these ancient nations held this noble tree, appears to me a strong argument of their refined taste and judgment; and I am concerned to say, that the neglect of its general culture in these kingdoms, is a reflection

FOREST - TREES. 31

tion on ours. It affords the most impenetrable shade of any tree yet known; and as Pliny justly observes, there is none which so well defends us from the heat of the Sun in summer, or admits it more kindly in winter.

The Italians and Turks used formerly to build most of their ships with this timber; and they had them of so enormous a size, that whole canoes, and other vessels for the sea, have been excavated out of their prodigious trunks; it is hard, close, takes a fine polish, and is valuable for a variety of useful purposes.

CHAP.

CHAPTER IV.

THE MAPLE TREE.

A Description of its Flower and Seed.

The empalement of the flower is monopetalus, coloured, and cut into five sharp segments at the brim, and is permanent. The corolla is composed of five oval petals which spread open, and are longer than the empalement. It hath eight short awl-shaped stamina, crowned by simple summits. The germin is compressed, and immersed in the large perforated receptacle. The style is slender. It hath two acuminate stigmas which are reflexed. The capsules are two, joined at their base; they are roundish, each being terminated by a large wing, inclosing one roundish seed in each.

The SPECIES are:

1. The greater MAPLE, in England falsely called the SYCAMORE, and in Scotland the PLANE TREE.
2. The Norway MAPLE, with Plane-tree leaves.
3. The Virginian Flowering MAPLE.
4. The American MAPLE, with Scarlet flowers.
5. The Virginian Ash-leaved MAPLE.
6. The Common or Lesser MAPLE.
7. The Greater MAPLE, with striped leaves.
8. The Norway MAPLE, with striped leaves.

THE two first mentioned being the largest growing and hardiest trees, are of course most proper for extensive plantations and exposed situa-

situations; for which reason, I shall first direct their culture until of a considerable size, and then proceed to the other sorts.

Their seed ripen in autumn, when it must be gathered in fair weather, and spread in an airy place until thoroughly dried, which it may be in about four or five weeks. The general practice is, to sow them at this time; but, from long experience, I have found it better, and I have raised more, and finer plants, by mixing the seed with sand, or loose sandy earth, kept defended from severe frosts, or much moisture, until February, or the beginning of March, as the weather is more or less favourable: If not straitened in land, sow them in drills, as has been directed for the Beech, but thinner; or if otherwise, sow them in beds only eighteen inches broad, with alleys of the same width, to be covered to the depth of about three quarters of an inch.

The following February or March, dig the alleys, and cut their roots to about five inches under the surface, which is easily performed with a sharp spade; then draw out the largest plants where too thick, (which they must be, provided the ground is good, and has been properly dressed and kept clean); let these be planted in a good mellow soil, in drills cut out with the spade quite perpendicular, that the plants may stand upright; let the lines be eighteen inches asunder, and the plants at eight or nine inches distance; and here they are to remain but one year, the ground being tolerably good.

In the following October, when the plants in general will be about two feet high; let these
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that were transplanted, as well as the seedlings be raised, shorten their top-roots, cut off any cross lateral branches, and remove them to another nursery, where they ought to be planted in rows, two and a half feet asunder, and fifteen inches in the row, to continue two years.

From hence remove them again, at the same season, and plant them in rows five feet asunder, and two and a half feet in the row, where they may continue four years.

These, in an ordinary soil, will now be from twelve to fifteen feet high, and, if required of a larger size, for future purposes, they may be removed to any convenient situation, and planted eight or ten feet asunder; when, any time after two, and not exceeding eight or ten years, they may be placed where designed to remain: And if, during that time, they have been carefully raised, skilfully pruned, and brought to their proper form, and moderately watered at planting, which, in a dry summer, may be necessary to repeat two or three times; when your labour with them is at an end.

I have directed both spring and autumnal planting for this and other trees; the reason for this is, that though the autumn is preferable for most of the deciduous kinds, when strong and well-rooted, yet when young, before they have come to any tolerable height, they are apt to be injured by frost, and forced out of the ground in severe seasons.

The occasion of so frequently removing these trees when young, is, that they naturally grow with downright carry-roots, though, after undergoing

dergoing the discipline here prescribed, no plant roots better, or is more patient in being transplanted, and even when of a large size.

There is no tree, yet known in this climate, is so proper to be planted near the sea, as the Great Maple, where I have known it grow luxuriantly, after many other kinds have been tried in vain ; and, in a few years, their shelter will cherish and bring forward many other sorts, which no art can otherwise effect.

This tree, however valuable, should not be planted near the house, or by the sides of walks that are intended to be kept in order ; for their leaves exhales a sweet clammy juice that entices great quantities of insects, which eat them full of holes, and render them unsightly ; besides, they cast their leaves very early in autumn, which putrify with the first moisture, become offensive, and render the walks both disagreeable, and troublesome to be kept clean.

I have not yet had an opportunity of planting the Norway Maple near the sea, but, in many other situations, I have planted them in concert with the common large sort, and found them equally hardy, and of as free a growth : They are a much handsomer tree, and their leaves have not the noxious qualities of the other.

The third, fourth, and fifth sorts, are handsome trees, and proper for the wilderness, and other ornamental plantations, but should not be planted singly, or in cold exposed situations in this climate, as they commonly suffer much, both by the violence of the westerly, and coldness of the north and

east winds. They may be propagated from seed as the other kinds are, but as it is not easily had in this country, we raise them from layers, from which they succeed well, when laid down in autumn or spring, and will be sufficiently rooted in a year.

Having carefully raised your layers, and dressed them as usually practised, plant them out in a quarter of good well-prepared ground, in rows, three feet asunder, and a foot distance in the row; let them be watered, to settle the earth about their roots, and remain here two or three years, from whence remove them to where they are intended to remain for good.

The common or lesser Maple, which produces abundance of seed with us, is easily propagated from it, in the same manner as the larger kind, and may be sown in beds three and a half feet wide, according to the common practice, and, when two years old, let them be planted in the nursery at two feet asunder, there to be kept for two years more, when they will be fit for the purposes designed. This is a tree of humble growth, seldom rising above twenty-five or thirty feet high, and therefore not generally used in large plantations of timber trees, but is very common in the hedge-rows over most parts of England.

The large striped Maple, is commonly propagated by budding on the plain kind, and may also be raised from its own seed, many of which will be as finely variegated as the trees that produced them; a circumstance very uncommon in other variegated plants, which rarely produce their own likeness.

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The striped Norway Maple, is also propagated by budding on the plain kind, and is a finely variegated tree, tho' I cannot say that the seed of them will produce variegated plants, never having been able certainly to procure them of the true kind, tho' I have frequently sown them as such ineffectually.

Of these trees, the first, second, and sixth sorts particularly, will prosper in very indifferent, coarse land, but most affect that which is deep and moist, tho' not wet or stiff; in such places they will make a surprising progress, and in a few years become stately trees. The third, fourth, and fifth sorts, delight most in a firm dry mould.

The various uses of this tree to the turner for household convenience, as well as to the joiner for tables, &c. are too generally known to require being particularly mentioned; but the timber of the common lesser Maple, is much the best for general use.

C H A P T E R V.

T H E O A K T R E E.

A Description of its Flower and Seed.

It hath male and female flowers on the same tree ; the male flowers are disposed in a loose catkin ; these have an empalement of one leaf, divided into four or five segments ; they have no petals, but many short stamina, terminated by large twin summits. The female flowers which sit close to the buds, have a hemispherical thick empalement of one leaf, which is rough and entire, almost hiding the flower, which has no petal, but a small oval germin, supporting a single five pointed style, crowned by single permanent stigmas. The germin afterward becomes an oval nut (or acorn) with a thick cover, having one cell, whose base is fixed into the empalement or cup.

The S P E C I E S are :

1. The common OAK.
2. The broad-leaved OAK.
3. The Virginian Scarlet OAK.
4. The Virginian OAK, with chefnut leaves.
5. The black Maryland OAK.
6. The white OAK of Carolina.
7. The OAK with woolly leaves.
8. The Chefnut-leaved Eastern OAK, with a
thick scaley cup.
9. The broad-leaved Eastern OAK, whose leaves
are finely cut, with a large acorn, and
hairy cup.
10. The Champion Chefnut OAK.
11. The red Maryland OAK.

12. The

12. The willow-leaved Maryland OAK.
13. The Burgundy OAK.
14. The gall-bearing OAK.
15. The cut-leaved Spanish OAK.
16. The swamp Spanish OAK.
17. The striped OAK.

THERE are many other kinds of Oaks mentioned in the catalogues of different writers on botany and gardening, but these I have here selected, I have found, from experience, the most distinct species, and finest trees of that tribe; many of the others being no way remarkable for beauty, and some of them no other than seminal variations: I therefore thought it unnecessary to enumerate more, as all the other sorts may be propagated in the manner I have directed.

The six sorts first mentioned are trees of the largest growth, and therefore should be planted where such are required; the others, being of more humble stature, may be confined to the wilderness, or smaller designs: But as the wood of the common English Oak is preferable to any other yet known, the foreign kinds should only be propagated; for ornamental purposes, until their virtues are better known.

This tree is usually planted out for good when very young, from a general belief, that it will not succeed in that operation, if suffered to come to any considerable age; and indeed, from the common methods of its culture, the observation is very justly founded: But by following better rules, which I shall here endeavour to give, and which are the result of a very considerable practice, it will be found to transplant with certain success, when of a large size.

No tree requires more attention to make a handsome well-proportioned free-growing plant, than the Oak ; and none is more neglected, however worthy our attention. It is rare to see a straight uniform plantation of them, but where they are crowded very thick together, or drawn up by the shelter of other trees.

The common method of raising Oaks, is by sowing them in beds very thick, to stand two years, and sometimes three. They are naturally carrot-rooted, running straight down into the earth, with few, and sometimes not any fibres ; and by remaining in this situation for some time, they are drawn up very tall and slender, their roots becoming hard and woody, which when cut, to a proper length, (which they must be) this operation is so very violent, that many of the plants fail, while the remainder are retarded in their growth several years, or perhaps become stunted, cross-growing, and shrubby : But, to remedy these evils, pursue the following system, collected from observation, and in which I have been long successful, rearing many beautiful, straight, and well-proportioned Oaks.

As soon as you are provided with acorns, which are to be gathered in autumn in fair weather, and from the handsomest and most vigorous trees, let them be spread in an airy covered place, and frequently turned until quite dry ; then to be mixed with sand, or loose light earth ; be careful to protect them from vermin, frost, and moisture, until about the middle of February.

The

The autumn before you intend to plant your acorns, let a spot of good natural soil be well dug and trenched, in order to meliorate by the winter's frosts, &c. which must be again dug the following spring, then to be raked and levelled; and, in order to have the crop equal and uniform, try the goodness of your seeds, by throwing them into a tub of water, when the sound will sink to the bottom, and the rotten or decayed float on the surface. The quality of the acorns being thus ascertained, make shallow drills across the ground, with a small hoe, at eighteen or twenty inches distance; and in these drop your acorns, about two inches separate one from the other, covering them, with the back of a rake, to the depth of two inches; the ground is to be raked smooth, and kept clean and mellow during the summer months.

The beginning of the following April, cut them under the surface as directed for the Beech, there to remain until the next spring.

From this situation, as soon as their buds begin to swell, let them be carefully raised, without injuring their roots or fibres; and as soon as the ground is made ready, separate the straight free-growing plants from the crooked and shrubby; shorten their downright or bruised roots, but be very sparing of the small fibres; when the favourable plants are to be put into one quarter of the nursery, in rows, two feet asunder, and nine inches in the row; and the others into another, at the same distances: Let these plants be as little time as possible out of the ground; for this purpose, raise few of them at a time, but where there are a number
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of hands, I would advise four to be selected for the purpose ; one to be employed to raise the plants, another to prune them for the two that are appointed to plant ; by this expedient the necessary ditch will be made,; and should the ground be at a distance, I would have the plants laid on an handbarrow, that the earth adhering to the small fibres may be retained, but observe not to raise more than can be expeditiously set down, as already directed.

Where the land is good, and the seasons turn out favourably, the straight plants may be removed in two years ; but when either of these circumstances happen otherwise, they must continue to the third season.

The crooked and bushy trees, having stood two years in the nursery, they must be cut down to the ground, to remain two years longer ; and observe, that, as soon as their shoots are four or five inches high, to pinch off all but the most promising ; from whence the whole strength and juices of the root will be exerted in support of this single shoot.

Another method of raising these trees, with equal success, is, to sow the acorns on beds, in rows, seven or eight inches asunder, and two or three inches in the row, covering them to the usual depth, there to remain one year.

Observe that the beds have been as carefully prepared, as the ground planted in the drill way.

From these beds let them be removed the following spring, and having shortened their top-
roots,

roots, lay them in lines, cut perpendicular with the spade, eighteen inches asunder, and eight or nine inches in the line, where they are to continue two years.

From hence remove them, separating, (as has been directed in the foregoing culture,) the straight from the crooked, to be planted in different quarters, in rows, two feet and a half asunder, and one foot distance in the row; where they are to be kept for three years, and the crooked, if they have grown freely, are to be cut down in one, but if otherwise, not until after two years; to remain three years after being cut down.

Many writers of reputation, direct sowing the acorns, as soon as thoroughly dry, (which will be some time in October or November) for their vegetation is so strong that they are apt to shoot soon after they are gathered, (tho' not in the ground) and so become unfruitful. But I have found, from innumerable instances, the method I have directed will produce better-rooted and cleaner plants; that is, to prepare the soil the autumn before planting, as already directed, and not immediately when you plant, as from that imperfect culture, the surface of the beds will soon become hard and impenetrable by the winter rains. The vegetation of the acorns before sowing, will be preserved by the sand or loose earth; when any advance they may make before February, will not impede their vegetation, but, on the contrary, forward their future growth, provided care has been taken, to protect the acorns from moisture when mixed with the sand, &c.

This

This tree, having been managed as here directed, will now be of a proper age and size for removing to the plantation for good, and, from the abundance of their roots, and good proportion of their bodies, will resist the most violent winds; but such as incline to provide large trees of the common English Oak, for future purposes, must proceed yet farther, and as I shall here direct.

Having made choice of a good mellow piece of ground, that had been well dug the preceding autumn; about the end of March, or beginning of April, let it be again dug and well levelled, clearing off all stones and weeds. As soon as the buds of the plants begin to swell, raise such (which ought to be the straightest and finest) as you intend to further cultivate, and improve in the nursery; continue to shorten such roots as tend downwards, and to smooth such spreading fibres as are too long, or have been wounded with the spade in raising; and where there are an over abundance of fibres, you may also cut away some of the smallest, which, should the trees not be immediately planted, will decay, and sometimes bring on a mouldiness about the principal roots, which might prove very prejudicial to their growing: You must now cut away all ill-placed cross branches from their stems, leaving only a few of the smaller, at proper intervals, to detain the sap, for its greater augmentation; be careful that the buds of any of the shoots are not injured, as they are difficult to be repaired in this tree, in any other way than by cutting it down. Let the operations respecting this tree be done in the very gentlest manner, not shaking the plants, that they may take to their new situation, as much of the original earth as possible.

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The trees being now properly prepared, plant them in lines, five feet asunder, and two feet and a half in the line; give them a plentiful watering, to settle the earth to their roots; which must be repeated once a fortnight for three or four times, (should the season prove dry) as it will much promote their growth. In this nursery they are to remain no longer than four years, provided the soil is good and generous, but if poor and hungry, five or six: Let the ground be annually dug between the lines, and the trees pruned every spring, with the same care and attention as at removing. I cannot quit the article of pruning, without first observing, that no circumstance is attended with worse consequences to planters in general, than the neglect of timely and regular pruning their trees while young; and what must render it quite inexcusable, is, that even in extensive plantations, the expence must be but trifling, when only annually performed. The cutting of young and tender branches, can have no ill effect, either on the life or growth of the tree; but wounds made by lopping off old wood, much weakens, and often produces a gangrene that proves mortal; in some kinds it occasions an excessive bleeding; and in others, by imbibing too much moisture, occasions an unnatural extension of the vessels in the trees, by which they burst, which occasion their death. These are truths founded on nature, reason and experience, and which ought to warn all planters to a due performance of this operation, as, from the judicious practice, joined to the other articles of culture, the plants are not only preserved in a healthful free growing state, but may be formed to any shape or proportion, their nature will admit of; which if but neglected a few years, no future discipline can be expected to form fine trees. But should your
Oaks

Oaks become rude by neglect, the best season of cutting their large branches is in March; but for the young and tender, any time from autumn until spring.

The trees from this culture, will by this time be finely rooted, straight, and from ten to twelve feet high, and well proportioned; though but in an ordinary soil and situation, provided when first removed from the seed bed, they have been collected from the most favourable plants.

But to render them proper for transplanting of a larger size, remove them again to any convenient spot of tolerable ground, managing the roots as before directed; and plant them in lines, eight feet asunder, and six feet in the line, watering them plentifully at planting; where they may continue six or seven years, by which time they will be about twenty feet high.

Should it be necessary to make a reserve of large trees; remove them once more, and plant them twelve feet asunder; giving them an abundant watering at planting, and repeat it three or four times, more or less as the season may require. In this situation they may continue, for eight or ten years, for any new design that may require them, when, by a careful removal, and four or five plentiful waterings the first and second summer, they will grow as luxuriantly as if they had been planted in the same soil, from the smallest size, and arrive full as early to maturity, with this advantage, that the trees, from the regular and timely pruning they have had, must of course be formed to their proper shape, and will in future give little or no trouble.

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Though most of the deciduous trees, particularly the large kinds, succeed best, when planted in autumn, yet the Oak is one exception to this general rule, as it has been found to transplant with more safety, and to grow more freely, when moved in the spring; therefore in this season it should be executed, whether in wet, or even in swampy lands, and I have often known large plantations to fail entirely by an autumnal, or winter planting.

This noble tree, the monarch of the woods, the boast and bulwark of the British nation, will grow freely in a great variety of soils, and might be propagated in the wastes, appropriated to the rearing of trees of the indifferent kinds, or even to less valuable purposes. This I have experienced from attending to its nature and properties; for though, like most other trees, it at first affects a found deep mould, yet it will, notwithstanding, prosper exceedingly on the coarsest moist gravel, loam and sand, or stiff heavy clay and till (which most other trees abhor), and that too when the soil has been so sterile and hungry as not to afford grazing for sheep.

The striped Oak, is propagated by budding or grafting on the common kind, and is beautifully variegated, which I have much improved, both in the brightness of its colours, and size of the leaf, by joining it to the scarlet Virginian, and chestnut-leaved kinds.

The tenderer sorts of Oaks will be rendered more hardy, and the dwarf kinds improved in size, by grafting and budding them on the common sort; and is the most unexceptionable practice, to procure

procure the different species of this fine tree, in its greatest perfection and beauty.

The value and uses of the wood of this tree, are so universally known, that it would be an insult on the understanding, to employ time in pointing them out.

You have been just directed to cut away all ill-placed and cross branches, leaving only a few of the smaller, at proper intervals, in order to raise the sap, for a greater encrease of the trunk; while this is doing, give me leave to observe, that, you must be careful that the branches are not so numerous, as to retard the spreading or the encrease of the root, (through which life and vigour is conveyed) by too great an ascending attraction of the sap; in this proportion and no other, can we pretend to excel the works of nature, which are supported by an harmony, we can only attempt to follow. This observation should ever influence our conduct, not more in the line for which this treatise is purposely written to advance, than in any other of nature's works.

In the proper use of the knife, consists the formation of our trees, and giving an encrease of growth, where a deficiency is found, whether in the *stem*, *branch*, or *root*.

As sometimes the practise of dibbling, is used for transplanting, and even of trees; I do by no means allow of it, and against which such a number of objections can be brought, that I am satisfied it is unnecessary to point them out, in a treatise designed for persons of discernment, and liberal principles,

principles, who would by no means countenance a practice, which would assist in continuing a slovenly manner of doing work, which I would gladly banish. I have found this practice unfavourable even in planting *Cabbages*, *Colly-flowers*, *Potatoes*, &c. therefore would recommend universally, the use of the *spade*, and for small articles, the *trowel*.

An Account of a new Species of the OAK, in a Letter from John Zephaniab Holwell, Esq; F. R. S. from the Philosophical Transactions, 1773.

ABOUT seven years since, Mr. Lucombe of St. Thomas, near Exeter, sowed a parcel of acorns, saved from a tree of his own growth, of the iron or wainscot species. When they came up, he observed one amongst them that kept its leaves throughout the winter. Struck with the phenomenon, he cherished, and paid particular attention to it; he propagated it, by grafting some thousands from it, which I had the pleasure of seeing, eight days ago, in high flourishing beauty and verdure, notwithstanding the severity of the winter. Its growth is straight, and handsome as fir; its leaves evergreen; and the wood is thought, by the best judges, in hardness and strength to exceed all other oaks. It makes but one shoot in the year, viz. in May, and continues growing without intermission: whereas other Oaks shoot twice, namely, in May and in August. But the peculiar and inestimable part of its character is, the amazing quickness of its growth, which I imagine may be attributed (in some degree at least) to its making but one shoot in the year; for I believe all trees that shoot twice are some time at rest before they make the second.

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I had the curiosity to take the dimensions of the parent tree, (seven years old) and some of the grafts: the first measured twenty-one feet high, and full twenty inches in the girt; a graft of four years old sixteen feet high, and full fourteen inches in the girt: the first he grafted is six years old, and has outshot its parent two feet in height. The parent-tree seems to promise acorns soon, has blossomed, and forms its foot-stalks strong, and the cup upon the foot-stalk with the appearance of the acorn, which, with a little more age, will swell to perfection.

This Oak is distinguished in this country by the title of the Lucombe Oak. Its shoots in general are from four to five feet every year; so that it will, in the space of thirty or forty years, out-grow in altitude and girt the common Oak of an hundred. I have a walking-pole full five feet long, a side shoot from one of the grafts, only a year and a half old. From the similarity of the leaves of this Oak to those of the iron or wainscot Oak, it appears to be a descendant from that species, though it differs from it in every other particular. Several gentlemen round this neighbourhood, and in the adjoining counties of Cornwall and Somerset, have planted them, and they are found to flourish in very different soils.

CHAPTER VI.

THE ASH TREE.

Description of its Flower and Seed.

It hath hermaphrodite and female flowers on the same tree, and sometimes on different trees. The hermaphrodite flowers have no petals, but a small four-pointed empalement, including two erect stamina, which are terminated by oblong summits, having four furrows. In the centre is situated an oval compressed germin, supporting a cylindrical style, crowned by a bifid stigma. The germin afterwards becomes a compressed bordered fruit, shaped like a bird's tongue, having one cell, inclosing a seed of the same form. The female flowers are the same, but have no stamina.

The SPECIES are:

1. The common ASH.
2. The Manna ASH.
3. The Virginian flowering ASH.
4. The New-England ASH, with sharp-pointed leaves.
5. The Carolina ASH.
6. The white American ASH.
7. The black American ASH.
8. The red American ASH.
9. The white-flowering ASH.
10. The ASH with striped leaves:

HAVING gathered the keys of the common Ash about the beginning of November; from handsome vigorous trees, as soon as the weather is fair, spread them on an airy loft or covered

place, turning them frequently until quite dry, which, they will be in three or four weeks, in a proper situation ; then mix them with some loose sandy earth, protecting them from wet until the following spring, when they are to be sown about the beginning of April, on a well-prepared fresh mellow soil, in beds of three and a half feet broad, with alleys between the beds, of eighteen inches, and covered to the depth of three quarters of an inch. The seed will not appear until the succeeding spring, during which time the beds must be kept quite clean, and as loose and little poached as possible; in February, before the seed begin to spring, let the surface of the ground be gently raked over, removing all musty and foggy particles they may have contracted during the winter, throwing a little fresh rich mould over them, to replace what you have taken away, which will much promote the future growth of the plants. In this seminary, the trees are to remain only one year.

Having in the following *February* or *March*, prepared another quarter of good ground in the nursery, in the same manner as for the seed, remove them into it with as much expedition as possible, to prevent their small fibres from withering, cutting away no more than the downright top-roots; then lay them in drills, cut down perpendicular with the spade; let these drills be eighteen or twenty inches asunder, and the plants at eight or nine inches in the drill; give them a gentle watering at planting, and continue it three or four times, at proper intervals, as the weather may require, giving them a proper culture, for two seasons.

In *October*, as soon as their leaves are discoloured, remove them from this nursery; into another quarter

quarter of tolerable ground, placing them out in lines, three feet and a half asunder, and fifteen or sixteen inches in the line, where they may remain three years, observing to dig the ground between the lines every spring; but before you put them down, observe to cut off close to the stem, all strong and ill placed shoots, leaving a sufficient number of small branches, to attract and detain the sap for augmenting the trunk.

At the end of three years, you will find your trees about seven or eight feet high, strong, well-rooted, and of a proper size for extensive plantations; but where a succession of large trees are wanted, remove them every fourth year, pruning their roots and bodies as before directed, watering them at planting, and three or four times more, in dry seasons, at about twelve or fourteen days distance, giving them greater intervals in proportion to their size, as directed for the Elm, which if you follow, they may be removed at any size you chuse, without any sensible check to their growth.

All the other kinds are propagated by budding them on the common Ash, which being a large-growing hardy tree, will be a considerable improvement to the dwarfish and tenderer sorts.

The Ash ought neither to be planted in gardens, or near other trees, nor in any mixed plantation. There is no plant I remember, that so soon, and so much exhausts the virtues of the soil; and their shade is malignant to every production of the earth, being a meer step-dame to other trees: Let them be planted together, where notwithstanding these unfriendly qualities, if properly managed, they will yield great returns to the owner in a few years.

This tree will grow in very steril and barren soil, and in the blakest and most exposed situations; but in a deep mould, though of no generous quality, if but free from standing water, it will arrive quickly to a great size.

The wood of the Ash (next to that of the Oak) is of the most universal use, particularly for all the implements of husbandry. It has also this singular advantage, that, when young, it is as strong and lasting a timber as when old; but the value, and particular uses of it, being so universally known, renders it unnecessary to be more particular.

Before I dismiss this useful tree, give me leave to relate an experiment I made, in the early part of life, as it is much in its favour. In order to furnish myself with poles for espaliers and dead fences, I planted a number of them in copses, for which purpose they answered very well, and gave great abundance.

For this purpose, in a very obstinate heavy meadow ground, I planted to the extent of half a rood, or the eighth part of an acre, with Ash trees six years old, and about eight feet high. I placed them in rows, four feet asunder, and two feet distance in the row, where I let them remain untouched, only digging the ground about them every autumn, for four years, when I cut them down to about five or six inches above ground for the purposes just mentioned, which they fully answered my expectations, reserving twenty of the fairest plants, at proper distances, for trees.

I continued to dig the ground two years longer, and then left them to nature for five years more, that

that is, seven from being first cut down. Having more of them than answered my purpose, or that I could expect from so small a spot of ground, I measured off one half, and sold them for pollards and hoops, for which I got forty shillings.

I cut them again in six years, when they were stronger than at first, I sold them for fifty shillings.

In the following six years, I again cut them down, and though these were much the largest shoots, I sold them as before.

There now remained twenty trees on the ground, which I intended to stand for timber, ten of which grew amongst the copse I had sold. My intention was not to cut them until the decline of my life, that I might leave to posterity what observations I was able to make, of the profit a man who begins to plant when young, may reap from it in his own time : But some untoward events cut short my design, and I was obliged to sell them at twenty-three years growth, at seven shillings a tree, which was L. 3 : 10 s. for the ten trees on the copse ground, I had cut and sold three times before.

Thus it appears, that an acre of indifferent land (for mine was very bad) planted with Ash trees in the manner described, yielded in twenty-three years, L. 115 : 10 s. without any other expence than digging the ground for the first five or six years, and cutting the copse down for sale, which must be very trifling, yet necessary to be done with care in this manner : Let them be cut slanting, with sharp instruments, leaving all the wounds smooth and clean, to prevent the wet from lodging in the

stocks, as from hence it might communicate to the roots, and contaminate the whole plant; this work a common purchaser of the copse would probably pay little attention to, but leave them in such a rude unseemly state, as might be as displeasing to the sight as dangerous to their future growth. The best season for this work, is the month of February, before the sap begins to rise. I have not mentioned any price for the first cutting, having used them myself: These were planted at eight-feet high, and had stood four years from planting; so that, from the lowest calculation, they must have been worth more than paid the whole expence of labour: To which I must add, that, after selling the last cutting of my copse, I was informed by a friend who was a judge of their value, that I had been grossly deceived by the purchaser, and that I should have received one-third more than I did.

It is necessary to observe, for the benefit of such as incline to follow this practice, which may be worth the attention of such, whose situation it may suit, that, after the second cutting, I found I had planted my copse too thick, and that, had they been at greater distances, I should have reaped a considerably greater advantage from them: I therefore; from experience advise them to be planted in rows, six feet asunder, and three feet in the row.

C H A P.

CHAPTER VII.

THE LIME TREE.

A Description of its Flower and Seed.

The flowers have a concave coloured empalement, which is cut into five part ; it has five oblong blunt petals which are crenated at their points, and many awl-shaped stamina terminated by single summits with a roundish germin, supporting a slender style the length of the stamina, crowned by an obtuse five cornered stigma. The germin afterwards becomes a thick globular capsule with five cells, opening at the base with five valves, each containing one roundish seed.

The SPECIES are :

1. The broad-leaved flowering LIME TREE.
2. The red-twiggèd LIME TREE.
3. The green twiggèd LIME TREE.
4. The small leaved LIME TREE, of a tawney green colour both in the leaf and bark.
5. The striped-leaved LIME Tree.

THE first mentioned is the finest plant of the species : The second is next to be preferred; it has also large leaves, grows to be a stately tree, and the shining deep red colour of its bark has a chearful and agreeable effect in winter. The third and fourth sorts are much inferior in beauty, and grow in a loose straggling manner, nor ever make so straight or so lofty trees, they are therefore unworthy of propagation, in comparison of the two first ; nor would I have mentioned them, but to warn the planters to beware of this species, with
which

which the nurseries generally abound, and which, not being sufficiently known to nurserymen, may be indiscriminately raised with the others, which if placed by the sides of walks, or in the straight lines of avenues, must from the irregularity of their form, and difference of growth, very much deface such plantations.

The Lime tree may be propagated by seed, which ripens about the end of October, and when quite dry, should be mixed with sand, and protected from frost and rain, until the beginning of March; when they ought to be sown in a shady border of rich, moist, loamy soil, in beds three and a half feet wide, with alleys of eighteen inches, and covered to the depth of three quarters of an inch. When the seedlings begin to peep, let them be frequently watered, and increase the quantity as the plants advance: Let the beds, in autumn and spring, be managed as directed for other hardy seedling trees; and here let them continue two years.

The plants, raised from seed, make very little progress for three or four years; and as they may be readily raised from layers, which will save much time, and make equally good plants. I would advise this practice as the best method and most ready for furnishing plantations.

Therefore, being provided with stools, or mother-plants, as directed for the English Elm, and planted at the same distances, lay down their branches any time from September until April; only observe, that the plants laid down in autumn, will be better rooted, and have stronger shoots than those laid down in the spring.

A quarter

A quarter of generous fresh ground being well prepared, about the middle of October take up your layers very carefully, without tearing or bruising their fibres; shorten their roots moderately, and cut away such as cross each other: Should the layers be plentifully rooted, and thick-bodied in proportion to their height, so as not to be in danger of being displaced by the wind, they may be planted without topping; but such as are too slender for their growth, must be cut down, from six inches to a foot, more or less in proportion to the quantity of their fibres; plant them in lines three feet asunder, and fifteen inches distance in the line, giving the ground the usual culture of hoeing and digging as for other trees; and here let them remain three years; but observe to plant such as are not cut down, separate from the others, which will not only be more ornamental, but they will better protect each other from their equality of height.

From hence remove them, at the same season as formerly, to another quarter of stout ground, dressing their roots, and pruning their bodies, as directed for the English Elm, and plant them in lines, five feet asunder, and two feet in the lines; repeat the proper pruning in February every season, and also in spring and autumn give them the usual dressings; and, in this situation, they are to continue four years.

They are again to be removed into another nursery, observing to keep them in good deep ground, and plant them in lines, seven feet asunder, and three feet in the line, giving them the necessary annual pruning, and digging the ground between them; where they are to remain four years, and no longer.

By

By this time the trees, being eleven years old, will in general be above twenty feet high; provided the soil has even been but middling, and the culture given them that has been directed, but as a succession of large trees, that may be moved with safety, will always be wanting to gentlemen possessed of land, and lovers of improvement, as well as others, I advise, a number of these to be removed into another nursery, planting them at ten feet asunder, cropping the ground with such kitchen herbs as are best suited to the soil, which will pay both rent and labour; here the trees are to remain five or six years; by which time they will be from thirty to thirty-five feet high, and will succeed after removal, as well as the smallest plant, by giving them three or four plentiful waterings in dry weather, the first, and second season, provided there is a continued drought.

The Lime mostly delights in a rich-feeding loamy soil, but will grow freely in any tolerable land, of a competent depth, though coarse and heavy; they will also grow in sandy and gravelly land, but not with the same beauty or advantage, as, in such situations, their leaves, in dry seasons, are often infested with insects, and decay early in the autumn; therefore, in a thin hungry soil, they ought not to be planted in great numbers, though a few of them may contribute to a pleasing variety.

The timber of the Lime tree, is much more preferable than any kind of the Willow, being stronger, and yet lighter; it is used by the carver, by architects for framing the models of their buildings,
and

and by the turner for making bowls, dishes, &c. I am likewise assured, it is very proper for lining of rooms, and that, when painted, it will last long.

This graceful and magnificent tree, the greatest ornament of the British gardens and villas, and pride of planters in the last, and great part of the present century, is now in less esteem than formerly, though for what reason I cannot easily account, as it has more good properties, the value of the timber excepted, and that too, far from being useless, than most trees I know. It produces a large, tall, upright body, smooth shining bark, ample leaf, a goodly and extensive shade, healthful odoriferous blossoms, is admirable food for bees, resists the winds, bears lopping off large branches without injury, soon heals of its scars and wounds, continues sound to a great age, and, of all the trees yet known, (the English Elm excepted,) makes the finest, loftiest, and quickest palisade hedges.

I say then, from what causes this tree has fallen into disesteem, is to me surprising. It were presumptuous and insolent in me, to arraign the taste and judgment of the numerous, learned, and respectable body of planters in Great Britain; nor am I either weak or vain enough to make such an attempt, but I cannot help doing what I think justice to this plant. I have argued with many of them, in defence of its beauty and utility in various respects; the beauty of the tree I have never heard disputed, nor ever found the arguments against it to go further, than the defect of casting its leaves in autumn; but this only happens from their being planted in poor, thin, or hot soil,
which

which they dislike, and which, being frequently practised, I presume is the principal occasion for their falling into discredit; but as the spirit of improving is now encreasing, I hope still to live to see the *Lime* again reassume its former rank and character.

CHAPTER VIII.

THE HORNBEAM TREE.

A Description of its Flower and Seed.

It hath male and female flowers, growing separate on the same plant. The male flowers are disposed in a cylindrical rope or catkin, which is loose and scaly, each scale covering one flower, which hath no petals, but ten small stamina, terminated by compressed hairy summits. The female flowers are disposed in the same form, and are single under each scale; these have one petal, which is shaped like a cup, cut into six parts, and two short germins, each having two hairy styles, crowned by a single stigma. The catkin afterward grows large, and at the base of each scale is lodged an oval angular nut.

The SPECIES are:

1. The common HORNBEAM.
2. The Hop HORNBEAM.
3. The Virginian Flowering HORNBEAM.
4. The striped HORNBEAM.

THE common Hornbeam should be propagated by seed, which is ripe in autumn, and should be spread on a loft until dry, and then mixed with sand to preserve them, until the following spring, when they may be sown thin on beds of fresh earth, three and a half feet broad, with alleys eighteen inches wide between the beds, and covered to the depth of three quarters of an inch. This seed will remain a year in the ground before the plants appear; during which time, the earth

earth must be kept clean and mellow. In the following February, loosen the surface of the beds with a short-toothed rake, so as not to disturb the seed, and throw a gentle covering of fresh mould over them; where they are to remain for two years, if not too thick as the plants make but a slow progress the first season, and are naturally well-rooted.

From the seed-bed remove them early in October, or as soon after as the weather will permit, into any fresh spot of ground in the nursery. you can best spare, though of an indifferent quality; reduce the superfluous roots, cutting away such as cross one another, and plant them in rows, two feet and a half asunder, and a foot distance in the row; to remain three years, annually digging the ground between the rows.

By this time the plants will be of sufficient growth for hedges, where immediate shelter is not required, or for woods, to be mixed with other young trees; but where you intend at once to have the advantages of warmth and ornament, a little more labour is required.

Therefore, where you desire to have Hornbeam hedges planted at seven or eight feet high, remove them from the former nursery to another, and place them in rows, ten feet asunder row from row, and five feet distance in the row, training them annually in the regular hedge form, but observe to keep them light and thin in the top, when, after four years standing, they may be planted out where they are designed to remain, making complete hedges, for they will have such abundance of roots as to defy the strongest winds, and require no further expence or trouble than two or three

three plentiful waterings, and keeping their roots clean for three or four years.

The straightest plants intended for trees, may, at raising them from the first nursery, be separated from those for hedges, and planted in rows, five feet asunder, and two feet distant in the row; let them be annually pruned to their proper form, and from hence they may be removed after three or four years, to the places where they are intended to remain.

The second and third sorts are easily increased from layers, and make an agreeable variety in the wilderness, with other trees.

The striped kind is propagated by budding on the common, but the colours are not strong or lively.

Though I am not an advocate for the Hornbeam tree in ornamental plantations, or in generous soils and sheltered situations, yet from its being one of the hardiest trees known, the many good qualities of its wood, and the sudden shelter it affords when formed into hedges, gives it some claim to our attention, particularly in all cold and exposed situations.

It will grow surprisingly on the coldest hills, and in the stiffest, barren, and most worthless soils; nor do I know any useful timber-tree, that maintains itself so stoutly against the wind; so that, being of quick growth, and clad in its numerous leaves all winter, it is certainly one of the fittest plants to nurse and protect other valuable or delicate trees.

The wood is white, tough, and flexible, is useful for many articles to the turner, for mill-cogs, (in which it excels the Yew itself), stocks, and handles for tools, with many instruments of husbandry; it is a lasting fire-wood, and burns very clear.

It likewise, of all the trees yet known, best preserves itself from the deer browsing on it, so that clumps of them in deer-parks would be no small improvement, both in point of beauty, and for shelter to these animals, so destructive to other trees.

CHAPTER IX.

THE WALNUT TREE.

A Description of its Flower and Seed.

It hath male and female flowers at separate distances on the same tree. The male flowers are disposed in an oblong rope, or catkin, which is cylindrical and imbricated, with spaces between the scales; each scale has one flower, with one petal fixed in the outward centre, toward the outside of the scale. The petal is divided into six equal parts; in the centre is situated many short stamina, terminated by erect acute summits. The female flowers grow in small clusters, sitting close to the branches; these have a short, erect four-pointed empalement, sitting on the germin, and an acute erect petal, divided into four parts. Under the empalement sits a large oval germin, supporting two short styles, crowned by large reflexed stigmas. The germin afterward becomes a large oval dry berry, with one cell, inclosing a large oval nut with netted furrows, whose kernal has four lobes which are variously furrowed.

The SPECIES are:

1. The common WALNUT.
2. The large French WALNUT.
3. The thin-shelled WALNUT.
4. The double WALNUT.
5. The late-ripe WALNUT.
6. The hard shelled WALNUT.

7. The Virginian black WALNUT.
8. The Virginian black WALNUT, with a long furrowed fruit.
9. The Hickory, or white Virginian WALNUT.
10. The small Hickory, or white Virginian WALNUT.

MR. MILLER, in his Dictionary, seems to be of an opinion, that the first-mentioned fix are only feminal variations, and not distinct species, as in most other sorts of fruit-trees; and says, the trees raised from their different seeds, rarely produce the same kinds of fruit. This is a point I have not yet lived to determine; for though I have planted the seed of all the different species of the Walnut, I have as yet reaped but little fruit; however one circumstance I am well assured of, that the fruit of the second and third sorts, of which I have eaten many, are very different, and bear much finer fruit than the others: Therefore, to make sure of the best, at least for a gentleman's private use, I would advise, that these two sorts be inarched on the common Walnut, on which they will succeed, and produce fruit in one third of the time they would do from seed, though the tree will not be either so large or so lasting.

Of all trees, the Walnut is one of the most difficult to reduce to any regular uniform appearance; it naturally grows in a ragged disorderly manner, and pruning being destructive to it, it despises the art and industry of the gardener: With respect then to its form and growth, we will leave them to nature, and only endeavour to point out some aids, that will much assist in the early, and plentiful

ful production of good fruit, and which unassisted nature will be many years in effecting.

Inarching the particular kinds you chuse, has already been mentioned ; but in order to make extensive plantations for fruit, proceed as follows :

Having procured from France, a parcel of the largest and best-ripened nuts, of the second and third sorts, provide also a parcel of thin flat stones, tyles, or slates, from a foot to eighteen inches broad ; lay them close together in lines, the length of the quarter in the nursery, intended to be planted ; bury them in the ground about eight inches deep, and plant your Walnuts six inches asunder, and two inches deep, in a line over the middle part of the tyles ; the tender roots thus meeting with opposition, and unable to penetrate further, will spread themselves on the surface of the tyles, &c. but not having so much nourishment or moisture in dry weather, as when free in the ground, they will require frequent but gentle waterings, both the first and second summer, as they are to stand two seasons before removal.

Having finished the second season, early in the following autumn, or as soon as their leaves are decayed, and their shoots hardened, raise them carefully, and, without the smallest incision on root or branch, plant them again fourteen or sixteen inches asunder, on the same kind of bottom, or hard rubbish that will not invite the roots downward. These materials are now to be sunk three or four inches deeper, and made six or eight broader than before, as the fibres of the roots have extended themselves. At the end of two years, remove the

earth from the roots of some of the plants ; and if you find they have not near covered their bed, they may continue a third ; but if they have spread over the bed, and are pointing their roots downward, they must be removed : During the time of their continuance here, they will require moderate watering in dry weather.

Repeat this culture once more, making their bedding about three feet broad, when the depth of soil above them, must be not less than fifteen or sixteen inches ; plant them at two feet asunder, and, as before, without pruning roots or bodies, further than the small branches that grow near the surface ; and if these are rubbed off with your hand early in summer, while the shoots are tender, it will be preferable to the most skilful pruning : In this place, if the soil is rich, let them remain three years, or, if poor, four.

By this time the trees will be in a proper state for removing to where they are designed to stand, which, as they are chiefly intended for fruit, ought to be in dry sound land, with a sandy, gravelly, or chalky bottom, but by no means in a deep heavy mould, where the roots by their downward inclination, would imbibe the crudities of an ungrateful soil, and get below the influence of the sun and rains, which would not only affect the flavour of their fruit, but would keep the trees much longer from producing it.

Should you plant them in your orchard, let the distance be from thirty to thirty-five feet ; but why may we not plant them in our fields of wheat and other grain, at sixty or seventy feet distance, as they do in Burgundy, where they consider them as a
great

great preserver of their crops, by keeping the ground warm in winter, neither do their roots obstruct the plough? and if the Burgundians find their shelter useful with them, how infinitely more so must it be in this cold island of ours? But the advantages accruing from the general culture of this tree is not peculiar to France; for in a great part of Germany, they find it so profitable, that a law I believe still subsists there, by which no young farmer is permitted to marry, until he brings proof that he has planted, and is the father of a certain number of Walnut trees. The fruit will ripen perfectly well in all the cultivated parts of Great Britain; and the method of managing the trees, as here directed, being attended to, will render its fruit highly flavoured, ripen it earlier in the season, and bear a plentiful crop twenty years sooner than it would do, cultivated after the old manner. The best manure for fruit-bearing Walnut-trees, is, strewing the surface of the ground with ashes, the beginning of winter, the land having been first ploughed, or otherwise laboured, before that time.

How much would such plantations improve the beauty and wealth of this country? and how greatly is it to be lamented, that men of fortune so seldom undertake such noble public works, as an assistance to the poor, the general good of the country, as well as their own private interest? for large sums of money, which are annually sent abroad, would be saved in a few years, and that too at an inconsiderable expence.

Thus having directed the best culture, for suddenly procuring plentiful crops of Walnuts, it re-

mains to direct the most proper manner for cultivating the tree for timber.

The Virginian kinds for this purpose, but particularly the seventh and eighth sorts, are preferable to the others; they grow faster, and become larger and loftier trees, and the wood is also said to be of a superior quality.

The Walnut tree is more impatient of transplanting than most others; the top-roots, being of a pithy hollow texture, so do not agree with cutting; which, should it not destroy them altogether, weakens them so much, that they make little or no advance for several years, and indeed never become vigorous or comely trees.

Therefore, in order to have a plantation of them for timber, provide a parcel of their nuts, of the seventh and eighth sorts from Virginia, which may be easily had at a trifling expence; and having prepared your ground the autumn before, by a good deep ploughing, digging, or best of all, by a good trenching, in February plant your nuts in drills drawn out with the hoe, and cover them between two and three inches deep; let the drills be five feet asunder, and the nuts planted about eighteen inches distant in the drill; and as many of them are to remain, to fill the land properly with timber-trees, let the ground be kept clean by hoeing in summer, and mellowed by digging before winter, for two years; after which, you must carefully raise every second plant in the lines, without in the least disturbing what remains, which will leave them at a suitable distance for standing four or five years longer. After the first two years, the ground between the trees may be employed in crops of Turnips,

Turnips, Carrots, Beans, Cabbages, and various other kitchen herbs; which, if properly kept in order, will, from the culture the land receives, improve the growth, rather than injure the trees. From time to time, as they advance in height, the least promising must be taken away, by cutting them below ground, to prevent the roots of what remains from being injured; and this must be repeated, but not until their branches are near touching one another, as their standing moderately thick will promote their upright growth; this management is to be proceeded with, until the trees are left at the distance of about thirty feet.

If you incline to save the plants that are to be raised at two years old, take them up with the greatest care, without wounding the smallest part of their roots, or bruising their fibres, and immediately plant them out at full length, at a suitable distance, treating them in all respects as has been already directed.

Tho' it has been observed, that pruning in general is hurtful to this tree, the branches as well as roots being of a spongy hollow nature, yet, when it has been neglected to pinch off the young tender shoots, some degree of it will become necessary, where branches cross each other, as they would destroy themselves, and injure the whole tree; about the middle of September, let such then be cut off smooth, and close to the body, that the wound may heal, and be covered before the winter rains; and that as little of this may be practised as possible, let the plantation be annually examined, and all the young cross-growing branches taken away, to prevent the necessity of lopping old ones, which is doubly hurtful.

The

The soil for the Walnut intended for wood, need neither be so warm, or generous, as that for fruit. Indeed, where large growth is only desired, this tree should be indulged with a deep, sound, rich-feeding land, on which, if it inclines to marle in the bottom, they will grow amazingly; but, notwithstanding, they will succeed, and make goodly trees, in any ordinary soil that has a competent depth of mould, tho' coarse and stoney: I have likewise seen many stately trees of them on clay.

The value of the wood, for chairs, bed-steads, tables, wainscoting of rooms, cabinets, gun-stocks, &c. is universally known.

CHAPTER X.

THE CHESNUT TREE.

A Description of its Flower and Seed.

It hath male and female flowers on the same tree, sometimes at separate distances, and at other times near each other. The male flowers are fixed to a long string, forming a sort of catkin; these have each an empalement of one leaf, cut into five parts; they have no petals, but include about ten or twelve bristly stamina, terminated by oblong summits. The female flowers have also an empalement of one leaf, divided into four parts, having no petals, but a germin fixed to the empalement, supports three styles crowned by a reflexed stigma. The germin, which is situated at the base of the empalement, becomes a roundish fruit armed with soft spines, including one or more nuts.

The SPECIES are:

1. The common or Spanish CHESNUT.
2. The striped CHESNUT.
3. The Chinquapin, or dwarf Virginian CHESNUT.

THIS much neglected, tho' graceful and magnificent tree, by attending to its proper culture, for fruit, timber, and copsewood, might, in a few years, become among the greatest advantages this country can reap by planting: I shall therefore be particular in directing the best methods I know, of propagating them for these different purposes.

To

To raise them for fruit, procure a parcel of the nuts from Portugal or Spain ; pick out the largest, and brownest ; the goodness of the seed is known by its weight, to try which, throw them into water ; reject such as swim, but those that sink you may be sure are good ; preserve them in dry sand until the beginning of March, when, having prepared a spot of loose mellow ground, sow them in drills made with the hoe, three inches deep, the drills about fourteen inches asunder, and the nuts six inches in the drill, where, as they shoot freely, I would advise that they remain only one year.

In February, or early in the following March, (which, from repeated experiments, I prefer to autumnal planting of these trees,) remove them to another quarter ; shorten their top-roots, and with a sharp knife smooth them clean, sparing their spreading fibres, and keep them as little time as possible out of the ground, the better to preserve the fibres from moulding ; plant them in lines, two and a half feet asunder, and one foot distance in the line, keeping them clean in summer, and spading over the ground between the lines spring and autumn, when any cross ill-placed branches may be pruned off ; and in this situation let them remain two years.

They are again to be removed to another quarter, taking them up with such care, as not in the least to injure their fibres, observing to shorten their top-roots, to cut off such as cross each other, and smooth the ends of those that spread most, which will by this time be strong and more numerous ; at the same time, prune away any ill-placed branches from their bodies and tops ; then to be planted
in

in lines four feet asunder and two feet distance in the line, where, managing them in other respects as directed for the former nursery, let them continue three years.

By this time these trees will be of a proper age and size, either for ornamental plantations in avenues, clumps in parks, the wilderness, or in the orchard way for fruit ; but it may be not unnecessary here to observe, that the shade of the Chesnut, like that of the Ash, is obnoxious to other plants, and that they should therefore be placed in thickets, or in detached plantations, by themselves.

The ground intended for a considerable plantation of fruit-bearing Chesnut-trees, should have three or four ploughings the preceding summer and winter ; and if one good digging is added a little before planting, it will be a great improvement to the soil, as I hold the labour of the spade, to be of all others the best. This being done, your trees carefully raised, and their roots and bodies properly pruned, plant them in straight rows, six feet distant every way ; let the ground be annually dug, to encourage the spreading of their roots, and, at this distance, they may remain till the branches begin to approach each other, when you must take up, every second row entirely, and every second plant in the remaining rows, which will leave them at twelve feet distance ; the wood of the trees taken up, will be useful for many purposes of gardening and farming. Having dug or half-trenched the land, (for deep trenching would increase their growth, but retard their fruiting), it may, for some years, if of a good quality, be profitably employed in Potatoes, Cabbages, Turnips, and many other crops, which,
by

by digging in the leaves of the Chesnuts, when rotten, (the best of all manure for them), will, instead of exhausting, annually invigorate the soil, and improve the plantation both for fruit and timber. These trees having stood until their branches begin to meet as formerly, must again be reduced in the same proportion the others were, which will leave them at twenty-four feet distance every way, and at which distance they may remain for good. The wood of this felling will saw into small boards, being now about twenty years old, and whose roots must be taken out entirely, to prevent their impoverishing the land. The timber of these cut down, being of size for several useful purposes, will bring a considerable price from the joiner, cabinet-maker, &c. and the remaining trees, which already have produced fruit for several years, will henceforward bear vast quantities, and make great returns of profit to the owner.

- Thus having directed such a culture for the Chesnut, as if judiciously executed, will assuredly produce abundant crops of large well-flavoured fruit, much sooner than when the tree is abandoned to nature. I shall proceed to those intended for timber and copse-wood, the propagation of which will be attended, with little trouble or expence.

Let the field intended for this plantation, (which may be neither warm or rich) be fallowed the preceding summer, to get two or three good deep ploughings in winter, to sweeten and pulverise the soil, and to destroy all weeds. Having procured and tried your seed, make drills across the ground with an hoe, at four feet distance, in which set
your

your nuts, with the point or eye upwards, or fourteen or sixteen inches asunder, filling up the drills, and raking the surface smooth; and for this, and the following year, you may have a line of Beans between the drills, which must be topped, and by being kept clean, will be a protection to the young plants, and encourage their growth. At the end of two years, early in the spring as has been directed, remove every second plant in the rows, which will leave them about two feet and a half asunder, and at this distance let them remain three years. With the plants taken up as above directed, (being now two years old,) you may make any further plantation required; having some in reserve to make good any defect in the plantations.

At the end of three years, take up (so as not to hurt the plants that are to continue) every second row of trees, and every second tree in the remaining rows, which will leave them at the distance of eight feet by five. The plants now raised will have carrotty roots, and few fibres; so are not worth planting again, but will be useful for stakes and poles. Left any of the trees that are to stand should be loosened, or their fibres exposed by the taking up of these, let the pits be immediately filled up, and the ground dug over, in which state they are to remain another year; in February, let them be cut down, (reserving only the straightest and most vigorous,) at the distance of twenty-five to thirty feet; You may still continue to work the ground, and take dwarf-crops from between the rows for two years more; after this, they will soon cover the ground, when they must be left to nature.

Thus

Thus you have a copse plantation, which in seven years more, that is, fifteen years in the whole from the seed, that will abundantly repay the expence of labour and rent, and, will considerably increase every seven or eight years, for forty or fifty to come, when you will have a forest of noble timber-trees, that of themselves will be worth more than the value of the land at the highest purchase, besides these trees will produce fruit, but not in such abundance, or of so good a quality, as those that have been transplanted at due distances, and where the ground has been properly cultivated; transplanting promotes fructification, as, by it the roots are made to spread nearer the surface, whereby the juices are better prepared and digested by the sun and air, and, of course, their fruit better matured, and of a higher flavour, than those whose roots run deep into the cold, sluggish, and unprepared earth, from hence they must necessarily imbibe a quantity of crude and unwholesome juices, which will naturally be communicated to the fruit.

The striped Chesnut is amongst the most beautiful of all the variegated tribe, and, when mixed with other striped plants, has a most agreeable and chearful effect, the blotches being of a rich shining gold colour, strongly marked. This is usually propagated by budding, or inarching on the plain sort, though I have raised many of them by common grafting.

The Chinquapin, or dwarf kind, abounds in the woods of America, where it produces abundance of nuts, which by mixing them with dry sand, may be easily brought here, and in which all the nut kinds should be brought from a distance, and by not adverting to this simple
and

and easy preservative, we generally lose the greatest part of them. This tree grows in its native soil to about fourteen or sixteen feet high, and is sufficiently hardy to bear our severest winters. This may be propagated by its seed as the common Chestnut, or by inarching on it, which will increase its magnitude.

The fruit of the Chestnut tree is not only used for many elegant dishes in France and Italy, but is found a strong and healthful food for the labouring people, either made into bread, or in a variety of other forms: For which purpose, in a few years we might have abundance of them, as well as for feeding hogs, whose flesh they much improve both in taste and quality, and would render our bacon as good as the Virginian, or of any other country.

The leaves of this tree make excellent litter for cattle, which, when mixed with their dung, (particularly that of cow's well rotted), is an admirable manure for many kinds of flowers, green-house, or hot-house plants, and others of the most delicate tribe.

The best ground for the fruit-bearing Chestnut tree, is a loose moist (though not wet) gravel or sand: They will likewise succeed in any ordinary mixed soil, which, should it abound with small round stones, they must not be taken away, as their warmth will cherish and forward the ripening of the fruit.

For plantations of timber-trees, or copse-wood, you can hardly fail, provided there is a depth of soil, free of any standing water; they will grow on
F obstinate

obstinate clay, and on the bleakest declivities of hills, this tree, when fruit is not the object, grows more luxuriant in a cold, than a warmer climate.

The wood is useful for many essential purposes : It makes good tables, and chairs, and is the most lasting poles, when set in the ground with the rind on, for espaliers, palisade hedges, and dead fences : It will last longer than Elm, or even Oak, for pipes to convey water under ground. In Italy, the best casks for wine and other liquors are made of this wood, which has the singular property, when thoroughly seasoned, of maintaining its bulk, without shrinking or swelling, which most other timber does ; in ancient times it was much used in our building, of which was a part of London, and near to it were formerly large forests of this tree.

CHAPTER XI.

THE HORSE-CHESNUT TREE.

A Description of its Flower and Seed.

The empalement of the flower consists of one leaf, slightly cut into five segments. The flower is composed of five roundish petals, folded at their border, and waved; these are narrow at their base, and are inserted in the empalement. In the centre is placed a roundish germin, having a single style, crowned with a pointed stigma, attended by seven stamina, which extended to the length of the petal, and are declining, crowned with upright summits. When the flower is past, the empalement becomes a thick, roundish, echinated capsule, opening into three cells, in one or two of which are lodged globular seeds.

The SPECIES are?

1. The common HORSE-CHESNUT.
2. The yellow blotched HORSE-CHESNUT.
3. The white blotched HORSE-CHESNUT.
4. The scarlet flowering HORSE-CHESNUT.

THE first mentioned sort, though a native of Constantinople, defies the greatest severity of our winters, and soon becomes a large tree. The nuts of it may be sown as directed for the Sweet Chesnut, and, like it, should only remain one year in the seed-bed.

In the following February, or early in March, having reduced their top-roots, plant them in lines, three feet asunder, and at fifteen inches distance in the line, here to remain three years.

To encrease them to a proper size for avenues, or clumps in parks, and lawns, remove them to another quarter; dress the roots properly, and prune some of the under branches, with any others that cross each other, and are too thick, or are ill-placed; but beware of the large bud at the extremity of the leading branch, in which is inclosed the shoot in embryo for the succeeding season: Plant them in lines, six feet asunder, and two and a half feet in the line. In this situation, when in an ordinary soil, they may continue three, but not above four years, when the plants will be from twelve to fourteen or fifteen feet high.

The second and third sorts may be propagated, by budding them on the common kind, on which they will take freely.

The scarlet-flowering Horse Chesnut, is a beautiful plant, and produces a very rich and elegant flower. It is a native of America, but is sufficiently hardy, when four or five years old, to bear our climate, in very ordinary situations, tho' in its infancy is somewhat more delicate than the common: Therefore, having procured their nuts, (which you may easily do from South Carolina, where they grow abundantly) sow them as directed for the common kind, but in a warm sheltered situation, and in a rich loose sweet mould; the succeeding spring remove them to a situation and soil equally favourable and good, where they are to remain three years, when they will have acquired sufficient
strength

strength to put up with more common usage. This tree in America, grows to the height of thirty feet, but I have not seen any in Britain of near that size, and I doubt it will never arrive to that stature with us; notwithstanding which, it is well worth our cultivation, and has a fine effect in the wilderness, planted with trees of the same growth.

This may also be budded or inarched on the common kind; but they will neither make so handsome plants, nor ever grow to near the size of those raised from seed.

The Horse-Chestnut, is a tree of singular beauty when in bloom; and the common sort, which will succeed in almost all soils, (tho' best in that which is deep and well sheltered) is a very proper tree to be intermixed in ornamental plantations; but in bleak and exposed situations, it is idle to attempt it, for their wood being remarkably brittle, they are subject to be injured by every impetuous blast.

The fruit of this tree, is so extremely bitter, that even hogs will not eat it, but the Turks mix it with other food, for their horses that have coughs, or are broken-winded, for which it is said to be very efficacious.

The timber, except for fuel, answers no valuable purpose; however, I have been informed by a gentleman of much knowledge and observation on the qualities of wood, that it is very proper for pipes, to convey water under ground, and in that state, will last longer than many harder woods.

CHAPTER XII.

THE LARIX, OR LARCH TREE.

A Description of its Flower and Seed.

It hath male and female flowers growing separate on the same tree. The male flowers are disposed in a scaly caskin; these have no petals, but a great number of stamina, which are connected in a column below, but are separated at their points, and are terminated by erect summits. The female flowers are disposed in a conical shape, having no petals; these are placed by pairs under each scale, having a small germin, supporting an oval-shaped style, crowned by a single stigma. The germin afterward becomes a nut with a membranous wing, inclosed in the scales of the cones.

THE Larch tree may be propagated from seed; but the best manner of procuring it, is not generally known, at least I am certain it is very rarely attended to. The common method is, to gather the cones in autumn; and having half-roasted them in a kiln, a stove, or on a hearth before the fire, then to split the cones, and to pick out the seed with a knife or other sharp instrument, which are with difficulty got at, by which means many of the plumpest and best ripened seeds are bruised. In this practice I proceeded for several years, without the success suitable to my labour and expence. I sowed the seed, with attention, in different soils and situations, and repeated a variety of experiments, yet had thin crops in proportion to the seed sown; I at last discovered my error; and

and from experience, shall direct a method, by which, the seed may be procured as good, the plants raised in the same abundance, and with the same ease, as the common kinds of Fir and Pines.

I found, that tho' the cones of the Larch tree are at their full size in autumn, yet the greatest part of the seed they contain have not arrived to maturity, and that they ripen hanging on the trees, even during the coldest winter months. The seed are inclosed in so hard and thick a covering, that the severest seasons cannot affect them; therefore I deferred gathering the cones until the months of March or April, when they easily part from the tree, and many even dropped from it, which are found better than those plucked off. The cones thus procured, being fully ripe, should be spread in a dry covered place, until the weather comes in warm; in May or June, let them be exposed under glasses, placed in a south aspect, so as to receive the warmest influence of the sun: This must be repeated (removing them every evening before the dews fall) for several weeks, when the cones will open, and part with many of their best seeds by shaking them in a wire sieve; but as all the cones will not open, split them through the centre, from the bottom to the top with a piece of sharp iron: Let these be again exposed to the sun for a few days, when many more of the seeds will shake out, or may be readily separated from the husk, with the point of a knife.

Tho' the seed will keep good for four or five years, yet, when divested of the cone, they lose

their growing quality in a few months; therefore, as soon as they are taken out, let them be mixed with fine dry sand, and preserved in bags until the sowing season.

In the beginning of March, or as soon as the weather will permit, having prepared a shady border of loose, mellow, rich ground, exposed to the morning sun, sow your seed very thin in beds three and a half feet broad, with alleys of eighteen inches; press the seed gently into the bed with the back of a spade, so as, by making it smooth and level, it may receive an equal covering of fine compost earth, mixed with one-fourth of sea-sand, or in failure of it, the finest pit-sand, to be sifted over them to the depth of a quarter of an inch and no more. In a fortnight after sowing, if the weather proves dry, and not frosty, give them gentle waterings in the evening of every fourth or fifth day, and in six weeks they will begin to appear above ground. As these plants come up with the seed on their tops, which the birds are very fond of, care must be taken to protect them from those enemies, who otherwise will destroy them, which may be prevented, by driving a few forked stakes round the beds, and spreading over them a net, or any other thin covering. The plants being fairly above ground, they must for three weeks, be refreshed with a little water every second or third night, when it does not rain: But this must be given with care, and as lightly as possible, with a watering-pot that has a small rose to it; for these plants, notwithstanding they are classed amongst the hardiest trees, when advanced, are, in their infant state, very delicate; and very liable to be greatly injured, if not destroyed by heedlessly dashing on the water. This careful watering,
must

must be continued until the end of August, and tho' but once in ten or twelve days, increasing the quantity as the heat increases.

The weeds must be carefully taken out on their first appearance, otherwise, it will be impossible to draw them up, without bringing with them many of the plants.

It may probably be remarked, that I have directed much unnecessary trouble and expence in the culture of this hardy tree, which is now raised in great abundance, with much less ceremony: To which I shall answer, that, in point of expence, what I have now directed, is much the cheapest, as one pound of seed will produce, more than ten pounds in the common way; and, what is yet of much higher importance, one thousand plants, thus cultivated, are of more real value, than ten thousand in the other.

The end of March, or the beginning of April, the plants may be removed from the seed bed to the nursery; and their roots being shortened, let them be laid in rows, about fifteen inches distant, and six or seven inches asunder in the row, watering them at planting, which may be continued once a week, in dry weather, for five or six weeks, when they will be past danger; and here they ought to continue no more than one season.

About the same time, in the succeeding year, remove them to another nursery, but be now sparing of their roots, taking away only such as cross each other, with some of the straggling hairy fibres, and smoothing the extremity of the long ones; plant them in rows, at three feet distance,
and

and fifteen or sixteen inches in the row ; watering them when planted, keep them clear of weeds during the summer, dig the ground between the rows in autumn and spring, and, in this situation, let them remain two years.

By this time, in an ordinary soil, the trees will be from five to six feet high, and of a proper size to transplant in large numbers, and, in exposed situations, on meagre hungry ground ; but where beauty and shelter are immediately required in plantations near the house, provision ought to be made of larger plants : Therefore, for this, or the like purpose, let such a number of these trees as may be wanted, be removed to another nursery, and planted at the distance of eight feet by six ; still be sparing of their roots, which do not, like many other Forest-trees, admit of being much reduced or wounded, particularly, when large at planting ; let them be plentifully watered, digging the ground about them, as formerly directed ; and here they must remain three years.

These trees will now be from ten to twelve feet high, and of a very proper size to remove for ornament, shade and shelter, where they are intended to remain, and which may be accomplished without any great labour or expence. The plants, thus far advanced, should be removed earlier in the spring, than has been directed for the younger trees, which, in somewhat more temperate seasons, may be best performed, about the end of February, or early in March. At this time raise them carefully, without injuring any of their principal roots, and only smooth the extremities of their small ones with a sharp knife, taking up as much as possible of the earth adhering to them ; pour into the pit a
large

large watering-pot full of water before the tree is placed in it, another after the roots are half covered, and a third after all the earth is properly gathered about it. If the season is moist, these plants will require no farther trouble; but in case of a long-continued drought, they ought to be watered in thin dry soil once a fortnight; but where it is deep and found, every third week, and this to be repeated twice or thrice, or even four times, according to the state of the weather; but, in giving them water, do not pour it close on their trunks, but make a drill round them with the hoe, about a foot distant, into which gently pour the water, drawing the earth over the place again, as soon as the water is absorbed.

Most of the Larch trees, except those that are sheltered by an higher plantation, decline much by being exposed to the south-west winds; which is occasioned by unskilfully pruning them. This tree, planted in a soil with which it agrees, (nor indeed is it nice in its choice) will make prodigious shoots, which are both heavy and flexible when young, and should any number of the side-branches be cut away, the length of the leading shoot is too much increased, when the body becomes slender, and the tree naturally bends with its own weight, and grows obliquely; this evil in the Larch tree, is not to be redressed as in other trees, by reducing their heights, it being their certain destruction: I therefore advise, that not a single branch be taken from this tree, except such as by accident may have been broken or bruised, till they are fifteen or sixteen feet high; nor would I suffer any pruning, were it not to clear the surface of the ground, so as to admit the rays of the sun, to dissipate its noxious vapours: But as this may sometimes be necessary, when they have arrived at the height mentioned,
the

the lowest tire of branches may then be cut off close and smooth, about the middle of October; the following year a second time, and the succeeding a third. This will be clearing the trunk to about four or five feet high, higher than which they should never be pruned, to make them well proportioned and straight trees, capable of resisting the winds, which they will effectually do with this culture; besides, as they naturally grow in a regular pyramidal form, their greatest beauty is lost, when divested of their branches.

This is a noble and valuable plant; the bright red blossoms it produces in the spring, are both beautiful and fragrant, and the proper culture of it, claims our particular attention, for many reasons. It is a native of the Alpine and Pyrenean mountains, and loves an elevated situation: It will become a stately tree in the poorest hungry sand and gravel, and on the highest and bleakest hills, where there is but a few inches of soil; in short, it rejects no quality of earth that is dry, but in wet lands it will not succeed.

The many encomiums bestowed both by antient and modern authors on the virtues of this tree, and the great value of its timber, would exceed the bounds allotted for this work: I shall therefore only enumerate a few of the best attested circumstances, but which may be sufficient to recommend it to all judicious planters and others, lovers of their country and improvement.

From the wounded bark of this tree, exudates the purest Venice turpentine; and on the body and branches, grows the Agaric, a drug used in medicine. The famous architect Scamozie, built with
it

it many of the most superb palaces in Venice, and highly commends it; and Vitruvius laments that they had not enough of it in Rome for joists, and other parts that require both strength and durability, as well as for its property, of long resisting fire. The Forum of Augustus was built of this timber, as were sundry magnificent bridges by Tiberius. Posts of it driven into the ground become almost as hard as iron, and will bear an incredible weight. It bears the smoothest polish, and is so exceedingly transparent, that rooms wainscotted with it, will appear at a distance, (when candles are lighted,) as if in a glow of fire. Nor was it used for these purposes only, but in building of ships also; de Witfen, a Dutch writer on naval architecture, mentions a ship, thirty feet in length, to have been found not long since in the Numidian sea, twelve fathoms under water, chiefly built of this timber and Cypress, both so hardened as to resist the sharpest tools; nor had time in any part trespassed on it, though it had lain four teen hundred years submerged. It makes the best palats for painters to separate their colours on; and it was on boards of the Larch, that Raphael, and the most famous artists of that time, eternized their skill, before the use of canvas was introduced.

Is it not amazing, then, that thousands who have it in their power, will not be at a moderate expence to plant a number of this plant, on their barren heaths, and cold rugged hills, which, in a few years, would not only adorn, and, by the warmth they would afford, really improve the adjacent country, and, in less than an age, enrich their families?

CHAPTER XIII.

THE VIRGINIAN TULIP TREE.

A Description of its Flower and Seed.

The proper involucre of the flower is composed of two angular leaves, which fall off; the empalement is composed of three oblong plain leaves, like petals, which fall away. The flower is nearly of the bell shape, and has six petals, which are obtuse and channelled at their base; the three outer fall off; it has a great number of narrow stamina, which are inserted to the receptacle of the flower, having long narrow summits fastened to their sides, and many germin disposed in a cone, having no style, crowned by a single globular stigma. The germin afterward becomes scaly seeds, lying over each other like the scales of fish, in resemblance of a cone.

THIS tree is common in Virginia, and is to be found in the northern continent of America, from whence they are annually brought in abundance to Britain.

Some direct the seed to be sown in pots, and placed on an hot-bed; and when the plants are a year old, each to be planted in separate pots, and again plunged into another hot-bed; after which, they are to be kept in winter, in pots, and under frames, for three or four years longer, until they have acquired strength. This method I followed in my early practice, and no doubt it will both raise and preserve them for that time: But there is not any occasion to treat this tree with so much delicacy,

licacy, even in infancy : I shall therefore direct an easier and cheaper way of cultivating it, founded on experience, which, in an ordinary soil, and sheltered situation, will make much stronger and hardier plants, and by that means sooner prepare them for removal to the places, where they are meant to remain for good.

The beginning of March, prepare a bed of good mellow rich earth, well mixed with old rotten cow-dung, exposed to the sun, and sheltered from cold winds ; place over the bed an old frame and sow your seed, sifting over them, about half an inch of a soil prepared some months before, to consist of one load of old pasture-earth, one of well-rotted cow-dung, and half a load of sea or fine pit-sand. Some of the seed will probably make their appearance in nine or ten weeks, but much the greater part of them will lie in the ground until next spring ; I would therefore advise giving the beds no more water, than barely sufficient to cherish the plants that have appeared, which, for four or five weeks, should be screened from the sun during the heat of the day, but which afterwards should receive its full influence.

These circumstances being attended to, no further care is necessary for this year, than to clear the ground of weeds as soon as they appear ; and in winter, in violent lasting storms, to throw double mats over the frame, which must be regularly taken off, on the weather's growing mild.

In March of the succeeding year, carefully pick off from the bed with your fingers, all mossy, hard, and crusted earth ; smooth it again, and sift on a quantity proportioned to that taken away, of the same kind

kind of compost as already directed ; and about the end of April, or beginning of May, if your seed have been good, the plants will appear in abundance, when they must be frequently, but gently refreshed with water, lightly given as directed for the Larch. From this time, until the beginning of August, they ought to be screened from the mid-day sun ; but this I would not do by covering the bed with mats, as it draws the plants, and renders them tender ; but rather do it with an old reed fence, or, nail some thin boards together, the length of the frame, so high as to shade the surface of the bed from the meridian sun, yet admitting a free current to the air. By thus shading the plants, and at the same time suffering them to enjoy the open air, they will not spindly, but keep proportioned, and be more hardy. When this has been performed, no further care is necessary in this situation, but frequent and moderate waterings in an evening, and throwing a mat over the frame during any severe winter-storm.

About the beginning of the following April, (for this tree is late in expanding its leaves), prepare a spot of ground, in the same manner, and of the same quality with that directed for the seed ; raise the plants carefully with a trowel, without bruising their roots, which are soft and spongy ; and if they cannot be immediately planted, mix a pale-ful of sifted mould and water, to the consistence of pap, through which draw the plants one by one, until as much adhere as will cover their roots and fibres. This will prevent their drying, and in this state they may safely be sent to a considerable distance, and kept several days out of the ground. The roots of this tree do not admit of being much reduced ; therefore, at this time, cut only a little of the top-
root

root smoothly off, but let all the fibres remain, and then, in a sheltered situation, plant them in drills cut out with the spade, at a foot distance line from line, and six inches in the line. Five of these lines, will make a bed four feet wide ; and if you have more beds than one, leave an alley of three feet between them ; let them be frequently and more plentifully watered than formerly, in the evenings during the summer months ; after this, keep them clear of weeds, and in case of severe frost, (for the first winter,) throw a mat over them, loosening the ground between the beds in spring, when they will require no further attention in this plantation, where they should remain only two years.

From these beds the plants are to be removed to another nursery, of a good mellow deep soil ; but be still sparing of their roots, and plant them in rows, at three feet and a half distant, and eighteen inches in the row ; keep the ground clean and mellow by labour, as has been directed, giving them plentiful waterings in dry weather, during the first summer ; here they are to continue three years longer.

The culture directed having been attended to, these trees will now be sufficiently hardy to defy the assaults of our severest winters, and, being about six or seven feet high, will be of a good size for planting where they are designed to remain. In a generous deep soil, interspersed with other trees, (but not crowded) they will in a few years arrive to a great magnitude ; but in thin and hungry land, they make but a small progress, notwithstanding they will flower sooner.

In America, they often grow on a moist swampy ground; and in such I have planted them here, but without success, owing, I suppose, to our long wet winters rotting their tender roots.

They do not, like many other Forest-trees, admit of being planted to advantage of a great size, but they might undergo another remove more than has been here directed, when at the height of ten or twelve feet, which I have done with great success. I know of no tree, that pruning either root or branch, has a worse effect on than this, as it frequently kills it, or renders it stunted; therefore the plants should be reduced to the form you desire, in the nursery, by rubbing off all ill-placed buds, or, with your finger and thumb, pinching away the improper branches soon after their appearance, any other discipline they will not be subject to.

This plant is of an extraordinary beauty and stateliness, and highly deserves a place in all noble and elegant plantations. There is one to be met with in the Earl of Peterborough's garden, at Parsons-green, near London, which has continued in full bloom for several years: It is above fifty feet high, and the trunk in proportion, and would have been much larger, had it not been planted in a wilderness quarter, where it was long neglected, and injured by its branches being overhung, and the roots intangled with other trees, which prevented it receiving its due nourishment. Mr. Catesby, in his Natural History of Carolina, mentions it of being thirty feet in circumference in the trunk, and the timber highly valued by the Americans for its strength and durability.

CHAPTER XIV.

THE ACACIA TREE.

A Description of its Flower and Seed.

It hath male and hermaphrodite flowers in the same catkin, and female flowers in different plants. The male catkins are long, compacts, and cylindrical, and have each a three leaved small empalement; they have three roundish petals, which spread open in the form of a cup; these have a turbinate nectarium, whose mouth afterward grows to the parts of fructification; they have six slender stamina, which are longer than the petals, terminated by oblong compressed summits. The hermaphrodite flowers in the same catkin, are situated at the end; these have empalements, petals, and stamina like the male, and have a germin, style, and seeds like the female, which are situated on different trees, and are disposed in a loose catkin; these have a five leaved empalement, and have five oblong petals, with two short thread-like nectariums, and a broad germin longer than the petals, supporting a short reflexed style, crowned by a thick stigma. The germin afterward becomes a large flat pod, with several transverse partitions, having a pulp in each division, surrounding one hard roundish seed.

The SPECIES are:

1. The common or Virginian ACACIA.
2. The American ACACIA, with triple thorns, commonly called the LOCUST TREE in the West-Indies.
3. The Water ACACIA, from Carolina.

THERE are above thirty different species of this plant, that have been brought from Africa and America, but most of them are tender, and require the protection of the green-house or stove, and would be improperly classed in a Treatise on Forest-trees, particularly adabted for this climate; therefore I have only mentioned three kinds, which are sufficiently hardy to bear our severest winters, and to grow to a very considerable size.

The first sort is propagated by sowing its seed the beginning of March, on a bed of well-prepared mellow soil, shaded from the mid-day sun, which, in five or six weeks, will appear above ground, when they must be frequently watered in the evenings, during the hot and dry weather, and the weeds destroyed at their very first appearance.

About the beginning of April of the following spring, remove them from the seed-bed to the nursery, but be sparing of their roots, and plant them in lines, two feet distant, and a foot asunder in the line, watering them at planting; as well as three or four times more, should the weather prove dry, when they will require no further attention than to keep the ground clean, digging between the lines in the spring of the two following seasons, as they are to remain here two years.

From this nursery they may be transplanted to where they are to remain for good; but if they are wanted of a larger size, they must undergo another remove, and be planted in lines, three feet and a half distant, and eighteen inches in the line, treating them as formerly: But here they must continue no longer than two years; for as these plants do not naturally produce spreading roots, and will not
bear

bear to have them or their branches much cut, but rather that they should grow in a ragged, disorderly manner, with heavy tops; therefore they do not admit of being planted when large.

The second and third sorts, though they will also rise in the open ground, yet are somewhat shyer, but will appear sooner, and make better shoots, when assisted with a very moderate hot-bed, on which they may be sown the middle of February. When the seed appears, give them very gentle but frequent waterings, and let the frames be raised in the day-time, that the plants may have plenty of air; shelter them from the mid-day sun until about the beginning of August, when the frames may be removed until the winter's frost set in, when the glasses are to be replaced, but drawn off in mild weather.

The succeeding spring, in the beginning of April, remove these plants, and treat them as has been directed for the Tulip-tree; with this difference only, that if you choose to remove them a second time, they ought only to remain two years after the second transplanting.

All kinds of the Acacias are much improved in their form, by thrusting straight stakes into the ground, to which the leading shoot should be loosely tied with bafs.

The first-mentioned sort of these trees was formerly much used in England, for planting in avenues; but for this purpose, I know few plants more improper, as no art can reduce them to an uniform figure; and the branches are so hard and brittle, that numbers of them are broken off every

violent wind, which occasions them to have a ragged and disagreeable appearance: The different kinds of these trees, ought to be planted in the wilderness, or under the protection of some other plantation, where, by growing in concert, they will escape that misfortune, and where their negligent wildness of growth, and large bunches of sweet-smelling aromatic flowers in summer, have a pleasing effect, and intitle them to a place in all ornamental plantations.

They delight most in a deep feeding moist soil.

CHAP.

CHAPTER XV.

THE WILD CHERRY TREE;

In *England*, commonly called the BLACK CHERRY; In *Scotland*, the GREEN TREE.

A Description of its Flower and Seed.

The flower hath a bell-shaped empalement of one leaf, cut into five parts, it hath five large roundish petals which spread open, and are inserted in the empalement; and from twenty to thirty stamens, which are near as long as the petals, and are also inserted in the empalement, terminated by twin summits. It has a roundish germin, supporting a slender style, crowned by an orbicular stigma. The germin afterward turns to a roundish fruit, inclosing a nut of the same form.

The SPECIES are:

1. The common BLACK GREEN.
2. The common RED GREEN.
3. The large HUNGARIAN GREEN.
4. The GREEN TREE, with very small stones, and large black fruit.

Though this plant is not usually classed in the catalogues of Forest-trees, yet its stately size, fine form, beautiful and fragrant blossoms, the various uses of the fruit, and value of the timber, certainly intitle it to our attention, and places it in no mean rank, either for ornamental or useful plantations.

It is propagated from the stones of their fruit, which should not be gathered until perfectly ripe, and beginning to decay, when they must be divested of their fleshy pulp; and in four or five days when their humidity has evaporated, mix them in sand, to keep them dry, until their kernels are firm and dry, which will be in about a month; then, having prepared a spot of fresh mellow light soil, sow them in beds of three and a half feet broad, with alleys of eighteen inches between them. Should the following winter prove severe, and the frost strong and lasting, throw some Pease-haulm, or other light covering over them, to be regularly taken off, on the weather's becoming mild. In open winters no extraordinary protection is necessary; but after violent and long continued frosts, I have discovered many of the stones split asunder, when the kernels thus deprived of their covering generally decay, particularly if the frosts set in early in winter. About the beginning of April, the plants will begin to appear above ground, when, (in dry weather,) frequently watering them in the evenings for about two months, will much increase their growth.

The following February, remove these plants from their seed-bed to the nursery, in any tolerable soil not wet or stiff; and having reduced the top-roots, plant them in lines, two feet distant, and nine or ten inches asunder in the line; give them two or three waterings in April and May, in dry weather; dig the ground between the lines in autumn and spring, and let them remain two seasons.

Remove them from this to another nursery in October, still reducing their top-roots, smoothing the
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the extremities of those that spread, cutting off such as cross each other, with a few of the lowest branches, or any others that are ill-placed; plant them in lines, four feet distant, and eighteen inches asunder in the line; dig the ground as already directed, and if intended soon to bear fruit, let them stand here only two years longer; but, if intended for forest-trees, they may remain three.

These trees will now be from eight to ten feet high, and of a proper size for planting in woods and in wilderness work; but for groves, avenues, and clumps in lawns or parks, (for which purpose few trees are more proper,) they may again be removed, two or three times, planting them at distances proportioned to their size, as has been directed for the Elm, until they are so large as to be out of danger from cattle, observing not to keep them in any one place, more than three years between each removal.

But with respect to those principally intended for bearing fruit, a little more attention is necessary; for though, by sowing the seed of the largest, best ripened, and finest flavoured Cherries, and in a favourable soil, yet but few of the trees thus raised, will produce fruit equal to their original; for all kinds of fruit-trees degenerate extremely, by being raised from the seed, and tho' this tree does so in a less degree, than many of the others; yet, to insure and improve the best kinds, graft, or rather bud them, which is preferable for all stone-fruits, on fresh healthy stocks, of three or four years old, raised from the finest fruits, which, being easily performed, ought not to be neglected, to ensure a very valuable return.

A year

A year after budding, these trees may be removed to another nursery, to stand two years longer before planted out, for good, still reducing their downright roots, but encouraging those that spread near the surface as much as possible; and now all too luxuriant and superfluous branches are to be taken away, and the plant reduced to the form it is to remain in: From this practice, in two years more, it will be covered with blossoms, and loaded with fruit. But in this place, it will be necessary to caution against a general error, committed in the management of this and many other fruit-bearing trees, which is, pruning them to a considerable height with naked bodies. This destroys the beauty of the plant, as well as impairs the quantity and quality of the fruit, by exhausting the sap that should feed it; for the trunk will be soonest and best fed, whose branches are the least distance from the ground.

Though I have mentioned pruning this tree, yet I must advise it to be done as sparingly as possible, and only while the branches are young and tender, as lopping the old wood commonly occasions a gum and canker, that stunts and in general destroys the whole plant: But a little care and attention from the beginning, may easily remedy this, by rubbing off such young buds as are improperly placed; and this practice will preserve them longest in strength and vigour.

For improving both the size and flavour of the fruit of the Black Cherry, it should be planted in a fresh, mellow, dry sandy loam; for timber, it will grow to a large size in moist dry soils, even though poor and thin; but in wet ground, or stiff clay, it will not succeed to advantage. It is one of our
hardiest

hardiest trees, of quick growth, and, its many good qualities considered, I have been often amazed that great numbers of them have not been universally planted in all extensive designs.

The wood is hard, ponderous, and durable; it polishes very highly, and is used by the joiner for cabinets, chairs, and many useful purposes.

To the Black Cherry, being of the same genus, I shall add

THE BIRD CHERRY, in *Scotland* called
the HAGBERRY.

THO', in catalogues, this is placed in the third or lowest growing class of trees, that is, from fifteen to thirty feet high, yet I have seen it above forty, and have raised many of them myself above thirty feet, at sixteen years old. It is a plant of extraordinary beauty when in bloom, the blossoms being so thick as to cover the leaves, when the whole tree is as white as snow, and has an admirable effect amongst other flowering plants.

It grows freely from cuttings, which ought to be planted in a shady border in February, and in drills cut down with the spade, about eight inches deep, leaving two buds of the cutting above ground; let the lines be two feet distant, and the plants nine or ten inches in the line; where, keeping them clear of weeds, and digging the ground between them, here to be kept two years.

After that time, remove them to another spot, cutting away the superfluous roots and branches, and plant them in lines, three and a half feet distant,

tant, and eighteen inches asunder in the line; clean and dig the ground as before, and let them remain two or three years longer, when they will be of a proper size to plant where they are to remain.

This plant is extremely hardy, and will grow in almost any soil, but chiefly affects a deep, moist, feeding-mould, where it will make great advances very suddenly. This wood is useful for many different purposes in husbandry.

CHAPTER XVI.

THE POPLAR TREE.

A Description of its Flower and Seed.

The male and female flowers grow on separate trees. The male flowers or catkins, have one oblong, loose, cylindrical empalement, which is imbricated. Under each scale, which is oblong, plain, and cut on the border, is situated a single flower without any petal, having a nectarium of one leaf, turbinate at the bottom, and tubulous at the top, and eight stamina terminated by large four-cornered summits. The female flowers are in catkins like the male, but have no stamina; they have an oval acute-pointed germin, with scarce any style, crowned by a four-pointed stigma. The germin afterward becomes an oval capsule with two cells, including many oval seeds having hairy down.

The SPECIES are:

1. The white POPLAR.
2. The black POPLAR.
3. The trembling POPLAR, or ASPIN.
4. The ABELE.
5. The white POPLAR, with striped leaves.
6. The Lombardy POPLAR.
7. The Carolina black POPLAR.
8. The Balsam POPLAR from Canada.
9. The berry-bearing POPLAR from Canada.

I SHALL begin with the four first kinds of this tree, which are commonly known to us, and

and then proceed to treat of those that have been lately introduced into this country.

The first, second, and third sorts, are with the greatest ease propagated by cuttings, planted in February or March; and tho' the fourth will likewise grow from them, on moist ground, yet it more readily succeeds by suckers taken from the roots of old trees, of which they have great numbers. The cuttings or suckers are to be planted in the nursery, in lines, two and a half feet distant, a foot in the line, and eight or ten inches deep, when they will, in two years, make strong plants, which will be fit to be removed where they are designed to remain: But to be more expeditious, where shelter and shade are immediately required, procure truncheons or straight poles, eight or ten feet high; make a hole with a sharp stake, from eighteen inches to two feet deep, as the pole is longer or shorter; and in this set it, filling the hole full of water, pressing firmly in some fine mould, to keep the plant steady. From this cheap and simple practice, they will grow freely, and in a few years become large trees; their culture being so very easy, it is unnecessary to be more particular.

Of all the trees our climate produces, I know of none, that so great and general an advantage might be made, as by planting Poplars in the cold, wet, and uncultivated parts of this country; they will grow luxuriantly in the poorest wet bogs, in the most devouring clays, in burning sand or gravel, as well as in the most sterile barren moor, and the quick advance they make in such situations, is amazing. I have measured shoots of the white Poplar, eight feet long of one year's growth, and have

have often heard of its being exceeded ; but there is hardly any land so wet and sterile, as not to encrease them, three or four feet annually, for many successive years.

The shade of this tree is salubrious and friendly, both to animals and vegetables, and their leaves, which are ample and thick, pregnant with rich sweet juices, fall in such abundance, as soon to create a soil that will produce good meadow, or pasture grass, as the situation is moist or dry. To effect this, I would advise these trees to be planted on our useless land, in lines, ten feet distant, and five asunder in the line. In five or six years, take away every second tree, which will leave them at twenty feet by ten ; and in seven or eight years more repeat the same, which will make them forty by twenty ; at this distance they may remain until fit for the axe.

The Poplar naturally produces many branches from their trunks when young, which ought to be cut away close every third or fourth year, to the height of fourteen or sixteen feet, to admit a free circulation of air to the ground, as well as to promote the growth of the tree ; and when the soil has thickened, (which in a few years it will,) sow on it some white clover and natural grass seeds, saved from an old upland pasture. In doing this, the land is not to be ploughed, but the surface frequently loosened, by a light harrow with short wooden teeth, until well pulverised ; then cover the seed, by drawing some branches lightly over them, and rolling the ground. This may be done any time from March until August, as the shade of the trees will prevent the seed from perishing by drought ; but the sooner after March, the better, particularly,

particularly, where the land is very wet, as, by early sowing, the roots of the grafs will be better established, and not subject to be raised in winter, which frequent light rollings early in autumn, when the weather is dry, will likewise much contribute to prevent. The second spring after sowing, when the ground will be well covered with grafs, and fit either for pasture or mowing, the trees may be disbranched to the height of twenty-four feet, when the prunings will be useful for fuel, dead fences, and many other purposes in husbandry. It is remarkable, and what I have often noticed, that, immediately under the shade and droppings from this tree, the grafs is soonest eaten by cattle.

After these grounds have been pastured for eight or ten years, such of them as are tolerably dry, may be converted into corn-land, by taking away the line of trees at twenty-feet distance, which will leave the plantation at eighty feet by forty, a distance that will do little (if any) injury to whatever grows in it, but which, by alternately and judiciously varying the crops, will improve both the corn and grafs for ever.

The leaves of no tree yet known, has so good an effect in compost soil for flowers, as that of the Poplar, nor will any so soon thicken the earth on which they grow, to which may be added, that of its being a very handsome chearful plant.

Thus, at a very inconsiderable expence, large tracts of waste land in these kingdoms, that now remain barren, might, in a few years, be rendered beautiful, warm and fruitful. Should it not then be a reproach to the owners of these uncultivated

vated places, that an experiment so easy and cheap, as putting a parcel of cuttings in the ground, in such a manner, as here directed, is not tried? the success of which is certain, and which, if judiciously practised by a few, would as certainly be followed by numbers, to a very great and general improvement.

The trembling Poplar does not grow to the magnitude of the other sorts just treated of, and is therefore less proper for the purposes mentioned; but is, amongst all the trees yet known, the fittest for planting by the sides of rivers, to prevent their incroachments.

The wood of the Poplar is used for different purposes, by the turner, the cart-wright, and cooper for hoops; and that of the Abele (which is the best timber) is good both for flooring and wainscoting rooms, being extremely white, and subject neither to split, swell, or shrink: But notwithstanding these good qualities, in grounds intended to produce good and clean grass, I should rather advise the white and Lombardy Poplar, as not subject to produce suckers, which the Abele does in such abundance, as to destroy the grass, or other crops, where the land is not annually cultivated: For these reasons, this tree ought to be planted in proper situations, to run up quickly for timber, without any other consideration.

The white Poplar with striped leaves, is increased by budding it on the common white Poplar; but the variegation will be faint, if not planted in a thin poor soil.

The Lombardy Poplar has been but lately introduced into Britain ; it is a fine chearful pyramidal plant, grows faster than the common kinds, and affords an admirable shelter to every thing that furrounds it: It is propagated by cuttings, with equal ease as the others, and, so far as I have been able to observe, is as hardy, and will succeed in all the different kinds of land they do; so that, there appears great reason to believe, it will soon turn out a national benefit.

The black Carolina Poplar is a very graceful plant, but is far from being so hardy as any of the other kinds, their former year's shoot being subject to perish in hard winters, or where they are much exposed ; therefore this tree ought to be placed in a well protected situation, and in a good deep, feeding, moist, but not wet soil : For tho' in their native climate, where the winters are not so long as ours, they are most commonly found in watery grounds, and by the sides of rivulets, yet, from many repeated trials I have made, I find they will not succeed in such places here ; neither ought they to be planted in thin dry land, where frequent waterings in summer will be required to keep them alive. The young branches of this tree, which grow in an angular manner, are very singular : Their leaves are broader than any of the other sorts ; and, from their buds in the spring, issues a very sweet balsam.

The Balsam Poplar was sent in cuttings from Canada to Scotland five or six years ago, and being propagated with much ease, are now in the possession

sion of many. It is, of all the species, by far the most beautiful and magnificent plant. The leaves are very large, of a light cheerful green, and the bark of a smooth shining brownish colour. I have seen it in various soils, both wet and dry, and of a middling good quality, in all which it much exceeds the other sorts in luxuriance of growth. Whether it will advance with equal facility as the common kinds, in very poor and exposed situations, I shall not yet pretend to determine, as it has not been sufficiently long amongst us, to make the necessary experiments; but, from all the observations I have been able to make, it appears a hardy plant, from hence there is reason to hope, it will be an acquisition of the highest importance, both in point of use and beauty to our forests; and should I be indulged with health to pursue this process, I have no doubt of confirming it, by undoubted proofs.

The berry-bearing Poplar was introduced at the same time, and in the same manner as the balsam kind. It is likewise a plant of much elegance, not quite so broad in the leaf as the other, but of a gay lighter green, with a whitish bark, and deeply furrowed.

However this I have to observe of this tree, that, having planted some of their cuttings in rich, and others in a poor and less cultivated ground, I have lost a considerable number of the latter, while not one in an hundred has failed in the generous soil; from hence I conclude, that in making plantations of them in coarse, barren, or cold situations, the nursed

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plants

plants are much more preferable than cuttings, which does not in the least contradict their being very hardy when advanced in growth. But whatever their success may be, in forbidden soils and climates, we have the strongest motives to encourage them, for ornamental plantations, in situations that are favourable,

CHAPTER XVII.

THE LOYE, OR NETTLE TREE.

A Description of its Flower and Seed.

It hath male and hermaphrodite flowers on the same tree : the hermaphrodite flowers are single, and situated above the male. The empalement of the hermaphrodite flower is divided into five parts, in which there are no petals, but five short stamina terminated by thick quadrangular summits, with four furrows. In the centre is situated an oval germin, supporting two reflexed styles crowned by a single stigma. The germin afterward becomes a round berry with one cell, inclosing a roundish nut. The male flowers have their empalements divided into six parts, and have no germin or style, but in other parts are like the hermaphrodite.

The SPECIES are :

1. The NETTLE TREE, with black fruit.
2. The NETTLE TREE, with purple fruit.
3. The NETTLE TREE, with large yellow fruit.
4. The Eastern NETTLE TREE, with larger leaves and fruit.

THE first of these trees is a native of Europe, the second and third of America, and the fourth was discovered by the late Dr. Tournefort in the Levant, who sent its fruit to the Royal Garden at Paris, where they were raised, and from thence soon introduced into the British gardens.

They are all of them sufficiently hardy to bear our severest winters, and in ordinary situations, when of three or four years standing, and, being a tree of admirable shade, beauty, and use, deserves to be generally cultivated.

It may be raised either from seed, (which if you can procure, is the best method), or by layers: If from seed, sow them in the spring, soon after they are ripe, (which is commonly in January), about a foot deep, in pots or boxes, with the bottom pierced into holes, covered with oyster-shells or broken tyles, laying three or four inches of rough stoney gravel over them, to let off the moisture, and prevent the earth from becoming heavy and sour: Then fill the pots or boxes, with a rich loose compost mould, within an inch of the top; sow the seed, and sift over them, half an inch more, of the same quality of earth. Few of these seeds will appear until the following spring; but the pots or boxes must not be sunk in the ground, as is too commonly practised, in order to keep them moist; it is best to water them, keeping the pots out of the ground, as then the water is not detained, which would rot the seed and plants more, than any other ill management; besides, such as escaped, would be poor, starved, and stunted: Therefore, let the pots be set on stones or logs of wood, and placed where they may receive the morning sun only, until autumn, when they should be removed under a south wall, and continue there until the weather becomes severe, when they must be put under a covered frame, constantly removing the glasses or other covering in mild weather. About the beginning of the following April, remove the boxes to their first situation, when you must loosen the surface gently with your fingers, picking away the foggy
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or mouldy parts, and sift on a little fresh earth in proportion to what you have taken off. About the end of April, most of the plants will have appeared above ground, when they must be frequently but moderately watered in the evenings in mild weather, but in the mornings when inclined to frost, to be kept perfectly clean during the summer months, and protected as in the preceding winter, in severe weather.

The plants being a year old, raise them carefully out of the boxes, shorten their downright roots, and manage them as directed for the Tulip-tree, while in the nursery; with this culture they will very well agree, and which must be pursued until planted where they are to remain for good.

If you intend to propagate them by layers, let this be performed about the end of September, or early in October, as soon as their leaves begin to tarnish. The wood of this tree being extremely hard, they will not have sufficiently rooted until the second year, unless the summer has been uncommonly wet, or you assisted them with regular and plentiful waterings; therefore, if you intend to save a season, let this be particularly attended to.

About the end of March, or beginning of April, when you find they have sufficiently rooted, take away the earth from about the layers, of which be very tender, and with a sharp knife cut it off beyond the joint, where, if properly laid, the roots will principally appear; prune away all but the strongest and straightest shoot, and plant them in a nursery of good fresh soil, in rows, at two and a half feet distance, and a foot asunder in the row; give them frequent waterings until the roots are well

established; keep the ground clean, digging it between the rows in autumn and spring, and let them remain here two years.

These trees may now be either planted out for good, or removed to another nursery, cutting off the extremities of their roots, and all ill-placed branches, and placed in rows three and a half feet distant, and eighteen inches in the row, treating them as formerly, and letting them remain for three years.

The Nettle Tree will succeed in any ordinary land, but most delights in a deep moist soil, where they will soon become stately trees, with fine regular spreading heads, of a chearful green, which renders them extremely proper, either for clumps in parks, or single trees to ornament our avenues.

Next to the *Platanus* this plant was most esteemed by the Romans, both for its grateful shade, and *immortal* timber, as they stiled it. Of this the vast sum offered by Crassus to Domitius for half a dozen of them, then growing about his house in Rome, is an incontestible proof. It is doubtless amongst the hardest wood of any we know: It was formerly used for pipes, and all kinds of wind-instruments; and the roots make excellent handles for knives, with many different kinds of tools that require strength and solidity.

CHAPTER XVIII.

THE *LABURNUM*, or BEAN-TREFOIL.*A Description of its Flower and Seed.*

It hath a butterfly flower, with a short bell-shaped empalement of one leaf, divided into two lips, the upper being bifid and acute, the under indented in three parts. The standard of the flower is rising, oval, and reflexed on the sides. The wings are obtuse, erect, and the length of the standard. The keel is bellied and acute. It hath ten stamina, nine joined, and one standing separate, terminated by rising summits. It hath an oblong germin, supporting a single style, crowned by an obtuse stigma. The germin afterward becomes an oblong blunt pod, narrow at their base, filled with kidney-shaped flattened seeds.

The SPECIES are :

1. The broad-leaved *LABURNUM*.
2. The narrow-leaved *LABURNUM*, with long pendulous flowers.
3. The broad-leaved *LABURNUM*, with very short pendulous flowers.

THESE trees are propagated by sowing their seeds (which they annually produce in abundance) in March, on a bed of fresh earth, covering them about half an inch deep; and, in four or five weeks, the plants will appear above ground, when some gentle waterings in dry weather will much promote their growth.

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The following February or March, remove them from the feed-bed to the nursery, when you must shorten their roots, which are naturally carrotty, but which may be cut freely while young; plant them in lines, two feet and a half distant, and a foot asunder in the line; to be kept clean; dig the ground between the lines in autumn and spring, here to remain for two seasons.

From hence remove them, in October or February, to another quarter; still continue to reduce the roots that incline downwards, and smooth the extremities of those that spread, pruning off all ill-placed lateral branches, observing to leave some of the smallest at proper distances, to proportion the encrease of the stem; for this tree, by making prodigious shoots in the head, when the side-branches are cut off, bends with its own weight, and is afterward with difficulty recovered to a good form. This being properly performed, plant them in lines, five feet distant, and two feet asunder in the line; manage them as formerly directed, and prune them annually to preserve their form; in which situation they may remain three or four years, when they will produce their flowers, and make an agreeable appearance in whatever plantation you place them.

It seems to me somewhat strange, that the *Laburnum* has not been universally cultivated in our plantations, it being a tree of admirable beauty in May when in bloom, propagated with the greatest ease, and at the smallest expence. It will succeed in various soils, and even in that which is very poor and hungry; but where there is any considerable depth of tolerable mould, the progress it makes is amazing. Though I do not remember to have heard the quality of the wood recom-

recommended by any author, yet I am well assured it is very valuable for sundry purposes, and by some preferred even to mahogany, for its solidity and beautiful colour, which is a bright yellow, veined with dark purple; and I have seen a large table and a dozen chairs of it, in the possession of a noble Lord, which good judges of elegant furniture, thought the finest they had ever seen.

I have one further hint to communicate in favour of this plant, which alone entitles it to our attention, which is, that by mixing them in such plantations as are infested with hares, that while a twig of them remains, no other plant will be touched, and though eat to the ground every winter, they will spring with additional vigour the succeeding summer, and constantly supply these animals with a luxuriant food. This, to my certain knowledge, may be depended on; and the produce of five shillings worth of seed, properly raised and distributed, will furnish plants sufficient to protect 500,000 other trees. Many expensive and laborious experiments have been ineffectually tried to protect young plantations from this enemy of theirs, of which not any will be found more effectual than this cheap and no less certain remedy; and, however simple the discovery may appear, the effects of it will be of the highest use to every planter, who puts it in practice.

C H A P T E R X I X .

T H E A L D E R T R E E .

For a Character of this Species, we are referred by Mr. Miller, to the Tribe he includes under the Name Betula, (the Birch Tree,) which you will find in the next Article.

THIS tree delights in wet boggy land, and will even grow where water constantly stands, but, if planted in dry ground, is most pernicious and devouring, for, by attracting all the moisture and generous juices from the earth, it will soon render it totally barren. Some years ago, vast numbers of these plants were brought from Holland to this country, at a considerable expence, and unhappily for the owners, planted in large tracts of moist land, from whence no returns suitable to the labour and expence have been received. Had the same money been bestowed on planting Poplars and Abeles, they would by this time have highly increased the value of such estates, and become a general improvement; whereas the injudicious choice of this tree has proved a discouraging circumstance to many young planters, and probably deterred others from engaging in improvements of this kind, when abundant might have been their advantage, as well as contribute to their pleasures, by making a judicious choice, for which I shall endeavour to give some instructions, collected not from caprice and fancy, but from the best of human instructors, *Experience*.

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They are easily propagated by layers, or by cuttings of three, four, or five years growth, planted in February or March; but being a tree of a melancholy appearance, I chose to say no more of it, as sundry aquatics, of greater beauty and value, will grow abundantly faster in the same situations they like; and it is only to warn the unexperienced planter against the frequent use of them, that I have taken any notice of a tree I so much dislike,

C H A P T E R X X.

T H E B I R C H T R E E.

A Description of its Flower and Seed.

It hath male and female flowers, at separate distances on the same tree; the male flowers are collected in a cylindrical catkin, which is scaly, loose, and imbricated on every side, each scale having three flowers, which have two minute scales on the side. The flower is composed of three equal florets, fixed to the empalement by a single scale; each floret is of one leaf, divided into four oval segments which spread open; these have four small stamina, crowned by double summits. The female flowers grow in a catkin, in the same manner as the male. The common catkin is imbricated, having three scales which are every way opposite, fastened to the central string or axis, having two heart-shaped flowers pointing toward the apex, where it is situated. They have no visible petals, but a short oval germin, supporting two bristly styles, which are the length of the scales of the empalement, and crowned with a plain stigma. It hath no pericarpium, but the seeds are included in the scales of the catkin, which are oval and winged.

The S P E C I E S a r e :

1. The common BIRCH TREE.
2. The Poplar-leaved BIRCH TREE.
3. The Canada BIRCH TREE.

THE common Birch may be propagated either from seed, or suckers taken from the roots of
of

of old trees, but seedlings make the handsomest and best-rooted plants. I shall therefore first direct their culture, which, though one of the hardiest and most common trees our climate produces, (of which it is a native), yet is it seldom successfully raised from seed, which is generally owing to too much covering in the seed bed, and which it will by means bear, as the plants, when they first vegetate, are very delicate, and unable to force their way through any considerable depth of soil; but by observing the following simple practice, you will procure them in abundance.

The seeds of the Birch are ripe about the end of September or the beginning of October, when, having gathered them in a fair clear day, spread them thin on a loft floor until dry; after which, mix them with loose sand, and keep them in an airy place until the beginning of the following March. The ground for sowing them, which ought to be fresh and light, having been trenched or dug the preceding autumn, must now be pointed over, making it as loose as possible, and raked very fine, to be divided into beds, three and a half feet wide; sow the seeds, and press them into the ground with the back of a spade, without throwing any earth over them. If the weather is moist and mild, no further care is necessary; but if dry and frosty, which is often the case at this season, lay a little pease-haulm over the beds, for three or four weeks, which will keep the ground moderately moist, forward their vegetation, and defend them from being injured by frost, or destroyed by birds, who are very fond of them. About this time uncover the beds, keep the ground quite clean, and give them three or four gentle waterings about *noon*, from the middle to the end of April, the weather being
mild

mild and dry; which repeat more plentifully and frequently from thence until the middle of June, in mild *evenings*, when they will require no further attention.

The following March, remove these plants from the seminary to the nursery, shortening their top-roots, and plant them in lines, two and a half feet distant, and about ten or twelve inches asunder in the lines; to stand two years, if the land is good, and the plants have grown freely; but if in a poor thin soil, where their progress has been but small, they may continue three years; when, after the second year's growth, in the month of March, cut down such close to the ground as are the least thriven or crooked, when they will produce straight and vigorous shoots.

Those taken from the roots of old trees, or seedlings grubbed up from the woods, cannot have so good roots or free shoots as plants raised in a clean well cultivated nursery-bed, therefore they will require more time and attention, to make them equally good: For this purpose, having procured plants with all the roots you possibly can, shorten such as incline to run downward; cut away the broken or bruised, with all the musty parts contracted in the woods, for want of air; reduce likewise the tops of such as are too tall or heavy-headed, and lay them in drills cut down with the spade, at the same distances directed for the seedlings, and in depth proportioned to the size of the plants; the most certain rule for which, is to follow nature, and place their fibres to the depth they were in the woods, water them at planting, keep the ground clean, and dig between the lines in the spring. Having
stood

flood here two years, cut them down to the ground, to remain two years longer, when they may be removed for good.

The second and third sorts will bear our winters tolerably well, when mixed with and sheltered by other trees: They may be propagated either by layers, or budding them on the common kind; but the raising them from seed brought from America, is attended with great uncertainty, as it will not vegetate, if kept long out of the ground.

The Birch is a handsome plant; and though the wood is not amongst the most valuable, yet it is useful for various purposes; as well as for ploughs, and other instruments of husbandry.

The late Earl of Hadinton, the greatest, most judicious, and successful planter of his time in this country, (Scotland), with great propriety calls the Birch an amphibious plant, as it grows in rich and poor, wet and dry, sandy or rocky situations, not refusing any soil or climate; and its fragrant smell after rains, justly intitles it to a place in the wilderness; to which I shall only add, that by wounding the tree in the spring, a large quantity of juice may be extracted, that when fermented, becomes a spirituous, delicious, and wholesome liquor.

CHAPTER XXI.

THE SERVICE TREE.

A Description of its Flower and Seed.

The flower has a spreading, concave, permanent empalement of one leaf, divided in five parts; it has five roundish concave petals, which are inserted in the empalement, and above twenty wool-shaped stamens, which are also inserted in the empalement, terminated by roundish filaments. The germen is situated under the flower, supporting three slender styles crowned by erect beaded stigmas; it afterward becomes a soft umbilicated fruit, inclosing three or four oblong cartilaginous seeds.

The SPECIES are:

1. The true SERVICE TREE.
2. The manured SERVICE TREE.
3. The Maple-leaved SERVICE TREE.
4. The Virginian wild SERVICE, with leaves like the Strawberry tree.
5. The common wild SERVICE TREE.
6. The White BEAM, or AREE THEOPHRASTI.
7. The Quick BEAM, in England commonly called the MOUNTAIN ASH, in Scotland the ROWAN TREE.
8. The Quick BEAM, with striped leaves.

THESE plants, though not usually propagated for common Forest-trees, are yet well worth our attention in all collections for ornament; and for

for their sweet smelling blossoms produced early in summer, and their large bunches of bright red fruit in autumn, which have a very pleasing effect in the wilderness, or in clumps in parks, lawns, &c.

They are all propagated by sowing their seed; but that of the four sorts first mentioned, like many other fruits, seldom produce plants of equal goodness with those from whence the seed is taken, therefore, in order to preserve the different species, they must be increased by layers, or budding or grafting them on the common sorts, or Pear-stocks. These budded or grafted will make much finer plants than the layers, and on the Pear-stock they will sooner become fruitful, and bear fairer fruit than on stocks of their own species. I shall therefore proceed to the other kinds, of which I have raised great numbers from seed, without any sensible variation from the parent tree.

Having gathered the berries in October, divest them of the pulp, by rubbing them between your hands in water, and after that with sand, in which preserve them until the first dry weather in spring, and sow them on beds of rich well-prepared loose earth, three and a half feet broad, covering them to the depth of an inch. Few of these seeds will appear above ground until the following spring; but the beds must notwithstanding be kept perfectly clean, during the summer months; and as soon in February as the weather will admit, with a short-toothed rake, dress and loosen the beds, throwing on as much fresh soil as you have taken off of the hard and soggy stuff; the beginning of April, the weather being dry and not frosty, gently water

them, once a week in the mornings until July, which will much encourage their growth.

From the seed-bed remove them the following spring, but observe to shorten their top-roots, and plant them in a rich well-prepared soil, in rows two feet distant, and a foot asunder in the row, where they ought to remain two years, keeping the ground clean in summer, and digging between the lines in spring and autumn.

Having stood here two seasons, remove them to another nursery, cutting away all cross downright or superfluous roots; but be sparing of those that spread horizontally, and only smooth them at their extremities: Plant them at three and a half feet by eighteen inches asunder, treating them as formerly, to remain for three years, when they will be of a proper size to remove, where they are intended to continue for good.

Though the fifth, sixth, and seventh sorts, will answer for stocks to bud the others on, yet of these, the White Beam will make the best plant, which however is excelled by the Pear-stock; therefore, such as are intended to be budded, should be the most vigorous plants of a year's growth, and that have been planted in a generous soil, at the distance of three feet by fourteen or sixteen inches; to be budded the second summer after removal, then to stand two years longer, when they may be removed for good.

The Quick Beam with striped leaves, must likewise be increased by budding, and succeeds best on stocks of its own kind.

These

FOREST - TREES. 133

These trees in general, affect a strong moist soil, though the finest plants of the Quick Beam I have ever seen, were on a dry elevated ground: Their wood is much used by the wheel-right, as well as for many purposes of husbandry, and is excellent for fuel: Their berries are the most tempting to the black birds and thrushes, who will never fail to give their company so long as they last.

CHAPTER XXII.

THE JUDAS TREE.

A Description of its Flower and Seed.

It hath a short bell-shaped empalement of one leaf, which is convex at the bottom, and full of honey liquor; at the top it is indented in five parts. The flowers hath five petals, which are inserted in the empalement, and greatly resembles a papilionaceous flower. The two wings rise above the standard, and are reflexed; the standard is of one roundish petal, and the keel is composed of two petals, in form of an hart, which inclose the parts of generation. It hath ten distinct stamina, which decline, four of which are longer than the rest, and are terminated by oblong incumbent summits. It hath a long slender germin, sitting upon a slender style, crowned by an obtuse stigma; the germin afterward becomes an oblong pod with an oblique point, having one cell, inclosing several roundish compressed seeds.

The SPECIES are:

1. The common JUDAS TREE.
2. The Canada JUDAS TREE.
3. The Carolina JUDAS TREE, with pointed leaves.

THE first of these is a native of the warmer parts of Europe, and abounds in Italy, Spain, and the southern parts of France.

The

FOREST-TREES. 135

The second sort is common in Virginia, New-England, Canada, and most of the northern countries of America, where it is called the Red Bud, from the beautiful colour of its flower-buds.

The third sort is a common plant in the woods of Carolina, but differs from the other two, in the form of its leaves, which are pointed, the former being nearly round; the flowers of this too are smaller, and the plants, for three or four years, require a little more shelter in case of hard winters, after which, they will bear our climate perfectly well, in an ordinary situation.

These trees may be propagated by layers, which will produce plants sufficiently handsome, provided they are properly trained; but seedlings are to have the preference, and the more so, when they are raised from the seed of their native soil.

As soon as the seed is either received from abroad, or gathered at home, let it be dried and mixed with some loose sand, and preserved from frost and wet, until the middle or latter end of March, as the weather is more or less favourable. About this time, sow them on a bed of rich mellow dry soil, to be covered half an inch deep. In four or five weeks, the plants will begin to appear, when the bed ought to be hooped over and covered with mats, to protect them from the cold frosty winds, frequent at that season, the excessive rains which sometimes burst them, and in the warm season, to screen them from the scorching heat of the sun, which will much accelerate their growth. From their appearance above ground, they must be gently though frequently watered

in the mornings, while the weather continues cold, but afterwards in the evenings when mild. In this situation they will require no more attendance, than, in case of a severe winter or storms, to lay mats over them, removing them regularly as the air becomes temperate.

The succeeding spring, as soon as the buds begin to swell, remove the plants from the seminary, to a nursery of the same kind of well-prepared loose soil; shorten the top-roots, and plant them in rows two feet and a half distant, and about a foot asunder in the row; give them a gentle watering, which ought to be frequently repeated, in the evenings of dry weather, during the summer months, and keep the soil about them clean and mellow. These trees grow naturally in a wild irregular manner, and, when left to unassisted nature, are rather of the bushy Shrub kind. To correct this defect, place a stake by the side of each plant; and as it advances, tie the leading shoot to it, with a piece of soft bafs, which direction it will afterwards retain, and grow strait and regular. In case the following winter should prove severe, it will be necessary to lay some pease-straw over the roots, which in the spring, may be dug into the ground between the rows. At this season let all the low-growing branches, of the former year, be cut away, that they may not impede the vigorous growth of the leading shoot, which must be constantly tied to the stake, as it advances, observing to regulate this pruning, so as not to draw the stem too much, but to leave such a number of branches as will retain the sap for its proper nourishment, that it may advance with bulk proportioned to its height. If these circumstances are attended to, the
plants

plants will only require the additional trouble of keeping them clean, during their abode here.

The Judas Tree should not remain longer than two years, in the same nursery from the seed-bed, and therefore, the succeeding spring, they either may be planted out where they are to remain, or (which I would rather advise) committed to another nursery, and planted at greater intervals, for two years longer, where they may be treated in the same manner, as has been directed ; by which time, they will be large, handsome, and hardy plants.

Though the above method of culture, is the cheapest and easiest, for raising great numbers of them, yet such gentlemen as are above the consideration of a trifling expence, and would promote their growth as fast as possible, I would recommend the following method to be pursued, as it will make the plants double the size of those raised in the natural way.

For this purpose, the beginning of March, let the seed be sown thin in penny-pots, plunge them to their rims in a moderate hot-bed of tanners bark, and this in preference of one of horse-dung ; as the heat of the bark is more equal, lasting, and has less steam arising from it. When the seed has been a week sown, it must be very gently watered, every third or fourth day ; but as soon as the plants come above ground, every second day, and the quantity of water increased as they advance in growth. When the plants are about five or six inches high, which you may expect they will be about the beginning of May, draw out the strongest and plant them in separate penny-pots, and plunge them again into another moderate hot-bed,

bed, watering them frequently and plentifully, covering the glasses with mats in the heat of the day, when the sun shines, to prevent their being scorched, admitting a proper quantity of air, that they may not be over-drawn. In this state they may remain until about the first of August, when the bark will have lost most of its heat, the pots are then to be taken out of the bark, but still kept in the frame, but more and more exposed to the open air, until the glasses are entirely taken away, during the mild weather of the autumn months. On the approach of winter, the glasses must be again replaced on their frames, to protect the plants in stormy weather; taking every opportunity to expose them to the open air, when the season is temperate.

The following spring, let the small plants that were left in the pots, be carefully shaken out and separated, so as not to injure their tender roots; cut away with a sharp knife, the extremities of their downright and straggling roots, and put them in separate pots of the same size; plunge them again, with the others, that were re-potted the preceding summer, in a fresh tan-bed, until the month of July, by which time they will have made vigorous shoots; inure them by degrees to the air, and treat them as in the former year; only observe as the plants become much stronger, and of course more hardy, that they are more suddenly exposed to the open air, from which they will not require so much protection the following winter, even in hard weather.

When the sap begins to rise, the succeeding spring, carry these pots to the quarter of the nursery, where you intend to plant them, which should be

be as nearly as you can in such a soil, as has been directed for the seedlings, and sheltered a little by trees or hedges; make pits with a spade, at three feet distance by two, as deep, but something wider than the pots, from which shake them out carefully with their whole balls of earth, which may be easily done without injuring their smallest roots, then set them upright, but no deeper than they stood before; give them a plentiful watering; prune away the under branches, and any others that are ill-placed, and fix a strong stake by such of them as incline to be crooked, to which tie the leading shoot; and in this situation let them remain two years, digging the ground about them in autumn and spring, continue to prune away all superfluous ill-placed branches, when you may transplant them to the places intended, where they are to remain for good.

By attending to what has been directed for the propagation of this plant, it may be raised with such abundance of roots, as not to retard its growth, or feel the smallest check from a removal.

If I have been tedious in directing the management of the Judas Tree, it is on account of its singular elegance and beauty, when assisted by a proper culture, which is far from being generally known; and I cannot help thinking, it is from a general ignorance, we see it so very little propagated, even by men of knowledge in gardening. In its natural state, it grows in an irregular straggling manner; but by leading the principal shoot, as is directed, it may be easily elevated to the height of twenty-five feet
or

or more. The flowers are of a beautiful red, tinged with crimson and purple ; the leaves, a fine deep green, large, and nearly round. The flowers appear before the leaves are expanded, and, in well-grown trees, are so numerous as almost to cover the branches, which renders it one of the greatest beauties of the spring.

CHAPTER XXIII.

THE ELDER TREE.

A Description of its Flower and Seed.

The flower has a small permanent empalement of one leaf, cut into five parts; it has one concave wheel-shaped petal, cut into five obtuse segments at the brim, which are reflexed, and five awl-shaped stamina the length of the petal, terminated by roundish summits, which are an oval germin situated under the flower, having no style, in the room of which is a swelling, crowned by three obtuse stigmas. The germin afterward becomes a roundish berry with one cell, including three angular seeds.

THIS tree is scarcely ever planted but for the sake of its berries, of which some make wine, as well as use them for other purposes; but it has other good qualities to recommend it than these, for in cold barren climates and soils, it becomes a valuable plant.

It will grow amazingly fast in wet and dry, cold and warm, and indeed in all kinds of soils, and in the most forbidding situations, where thorns and the better kinds of hedge plants will not succeed, and with no other trouble than setting stakes in the earth, of four, five, or six years growth, and about three feet high, planted a foot deep, and about a foot asunder, and in three years you will have hedges that will resist the wildest cattle, and by their warmth, much improve the ground. These hedges being cut close to their trunks every third

or

or fourth year, they will branch out more numerously than ever, and afford a constant supply of fuel, which, in many situations, will prove a blessing to the poor inhabitants. It might also be used to much advantage in better situations, where plantations of the most valuable Forest-trees are intended, by planting them in thick lines in the most exposed places of the field, where, by their quick growth, they would afford protection against tempestuous and frosty winds, and highly contribute to the speedy advance of such plantations; and the Elders may be cut away by degrees, as the other trees advance.

However much this plant is generally disregarded, it is notwithstanding a handsome cheerful tree, and, when covered with its numerous clusters of white flowers in spring, and purple berries in autumn, has a very agreeable effect in lawns, clumps, &c. But I would by no means advise its being promiscuously planted in the wilderness or forest with other trees, as their creeping roots extend a great way, and would rob the plants near them of their proper nourishment; neither should they be placed in any great number near our dwellings, as the strong scent emitted from their flowers would occasion pains in the head; but, for the first-mentioned purposes of hurrying other plants, disposed at proper distances, they deserve our warmest attention.

A Letter

A Letter from Mr. Christopher Gullet to Matthew Maly, M. D. Sec. R. S. on the Effects of ELDER, in preserving Growing Plants from Insects and Flies.—From the Philosophical Transactions.

S I R,

I SHOULD not presume to trouble you, as a member of the royal society, with the following letter, did not the subject seem to promise to be of great public utility. It relates to the effects of Elder, in the preservation of different crops, &c.

1st. In preserving cabbage plants from being eaten or damaged by the caterpillar.

2d. In preventing blights, and their effects on fruit and other trees.

3d. In the preserving of crops of wheat from the yellows, and other destructive insects.

4th. Also in saving crops of turnips from the Fly, &c. &c.

1st. I was led to my first experiments, by considering how disagreeable and offensive to our olfactory nerves the effluvia emitted by a bush of green Elder leaves are, and from thence, reasoning how much more so, they must be to those of a butterfly, whom I considered as being as much superior to us in delicacy, as inferior in size. Accordingly I took some twigs of young Elder, and with them whipt the

the cabbage plants well, but so gently as not to hurt them, just as the butterflies first appeared ; from which-time, for these two summers, though the butterflies would hover and flutter round them like gnomes or sylphs, yet I could never see one pitch, nor was there I believe a single caterpillar blown, after the plants were so whipt ; though an adjoining bed was infested as usual.

2d. Reflecting on the effects above-mentioned, and considering blights as chiefly and generally occasioned by small flies, and minute insects, whose organs are proportionably finer than the former, I whipt the limbs of a wall plum-tree, as high as I could reach ; the leaves of which were preserved green, flourishing, and unhurt, while those not six inches higher, and from thence upwards, were blighted, shrivelled up, and full of worms. Some of these last I afterwards restored by whipping and tying up some Elder in their branche. It must be noted, that this tree was in full blossom at the time of whipping, which was much too late, as it should have been done once or twice before the blossom appeared. But I conclude from the whole, that if an infusion of Elder was made in a tub of water, so that the water might be strongly impregnated therewith, and then sprinkled over the tree, by a hand engine, once every week or fortnight, it would effectually answer every purpose that could be wished, without any possible risk of hurting the blossoms or fruit.

3d. What the farmers call the yellows in wheat, and which they consider as a kind of mildew, is in fact, as I have no doubt but you well know, occasioned by a small yellow fly with blue wings, about the size of a gnat. This blows in the ear of the corn,

corn, and produces a worm, almost invisible to the naked eye; but, being seen through a pocket microscope, it appears a large yellow maggot, of the colour and gloss of amber, and is so prolific, that I counted very distinctly 41 living yellow maggots or insects, in the husk of one single grain of wheat, a number sufficient to eat up and destroy the corn in a whole ear. I intended to have tried the following experiment sooner; but the dry hot weather brought on the corn faster than was expected, it had got into fine blossom before I had an opportunity of perfecting my intention; however, the next morning at day-break, two of my servants took two bushes of Elder, and went one on each side of the ridge, from end to end, and so back again, drawing the Elder over the ears of corn, of such fields as were not too far advanced in blossom. I expected, that the disagreeable effluvia of the Elder, would effectually prevent those flies, from pitching their tents in so noxious a situation; nor was I disappointed, for I am firmly persuaded that no flies pitched or blowed on the corn after it had been struck. But I had the mortification of observing, the evening before it was struck, that the flies were already on the corn, (six, seven, or eight, on a single ear) so that what damage had happened, was done before the operation took place; for, on examining it the following week, I found the corn, which had been struck, much more free of the yellows, than what had not. I have, therefore, no doubt, but that, had the operation been performed sooner, the corn would have remained totally clear and untouched. However simple the process, I flatter myself, it bids fair to preserve the corn from destruction, as this small insect is its greatest enemy. One of those yellow flies, laid eight or ten eggs of an oblong shape on my

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thumb,

thumb, only while on the wing to cross three or four ridges, which were only discoverable by viewing them with a pocket microscope.

4th. Whole crops of turnips are frequently destroyed, by being bitten by some insect; this I flatter myself might be effectually prevented, by having an Elder bush spread, so as to cover the breadth of a ridge, and drawn once forward and backward, by a man over the young turnips. I am confirmed in this opinion, for having drawn an Elder bush over a bed of young collyflower plants, which the fly had attacked, and would have totally destroyed, had I not used the Elder.

In support of my opinion, I beg leave to mention the following fact, from very credible information; about eight or nine years ago, this country was so infested with cock chafers or oakwebs, that in many parishes they eat up every thing green, but Elder. In this general devastation, a thought occurred to me, whether the Elder, now esteemed noxious and offensive, may not be one day seen entwined in the branches of our fruit trees, in order to preserve their fruit from destruction by insects: And whether the same means, which produced these several effects, might not be extended to a great variety of other cases, in the preservation of the vegetable kingdom.

The dwarf Elder (*Ebulus*), I apprehended emits a more offensive effluvia than the common Elder, therefore must be preferable for this operation.

On mentioning my observations of the effects of Elder on corn crops, to Sir Richard William Bampfylde, he persuaded me to publish them, which determined

FOREST - TREES. 147

terminated me to transmit them to the society incorporated for promoting the knowledge of natural things, as well as useful experiments, in which they have so happily and amply succeeded, to the unspeakable advantage and improvement of the world, which has occasioned me to trouble you.

I have the honour

to subscribe myself,

Sir, your most obedient,

and humble servant,

CHR. GULLETT.

*To Dr. Maty,
Secretary to the
Royal Society.*

C H A P T E R X X I V .

T H E T A C A M A H A C A T R E E .

A species of the Poplar, whose leaves are almost heart-shaped, hoary on their outer side, and the inner of a dark green. See Poplar tree, for a description of the flower, &c.

THIS tree grows spontaneously on the continent of America, where the inhabitants wound their stems in the spring, from whence flows a balsam, much esteemed by the physicians in those countries; this tree is sufficiently hardy to bear our severest winters.

It is easily propagated by cuttings, planted about the middle of February, in a rich mellow earth, shaded from the mid-day sun, and watered in dry weather, where, in one year, if the cuttings are strong, they will grow upwards of three feet.

The succeeding February, remove these cuttings to a nursery of a pretty deep soil; smooth the extremities of their roots; cut off the strong side branches, and plant them in rows, three feet distant, and eighteen inches asunder in the row; give them a plentiful watering; keep the ground clean; dig between the rows in autumn; and let them continue in this nursery two or three years, when they may be transplanted to the places where they are intended to remain.

This is a quick-growing graceful plant, and justly claims a place in the wilderness, or other ornamental

mental plantations. The leaves are long, thick, and of a bright shining green, with their under sides of a lively silver hue, which, when waving with the wind, makes an agreeable diversity. The buds are covered with a dark glutinous balsam, which smells very strong, and adheres to the fingers on touching them; they are of the number of the earliest plants that give us notice of the approach of spring. They will grow in any ordinary soil, but most affect that which is mellow and deep. Where there are any void spaces in the wilderness, occasioned by the death of any of your trees, this plant suffered to grow in its natural state, (which is thick and bushy) will sooner supply these defects, than most others.

EVERGREENS.

CHAPTER XXV.

THE PINE TREE.

A Description of its Flower and Seed.

The male flowers are collected in a scaly conical bunch, they have no petals, but many stamina, which are connected at their base, but divided at the top, terminated by erect summits; these are included in the scales, which supply the want of petals and empalements. The female flowers are collected in a common oval cone, and stand at a distance from the male on the same tree. Under each scale of the cone is produced two flowers, which have no petals, but a small germin supporting an awl-shaped style, crowned by a single stigma. The germin afterward becomes an oblong oval nut, crowned with a wing, included in the rigid scale of the cone.

The SPECIES are :.

1. The Scotch PINE, commonly called the Scotch FIR TREE.
2. The manured PINE TREE.
3. The PINASTER, or wild PINE TREE.
4. The large Stone PINE TREE.
5. The smaller Stone PINE TREE.
6. The Cluster PINE TREE.
7. The Eastern PINE TREE.
8. The Swamp PINE TREE, with long narrow leaves.
9. The

9. The Jersey PINE TREE.
10. The Virginian PINE TREE, with long narrow leaves, and a rough cone.
11. The Virginian PINE, commonly called the FRANKINCENCE TREE.
12. The New England PINE TREE.

THERE are many other sorts of Pines mentioned by different authors on Gardening and Botany; but these, from experience, and what observations I have been capable of making, are most worthy of general culture, in the climate of Great-Britain.

I shall begin with describing the common method of cultivating the Scotch Pine or Fir, in Scotland, by which many millions are annually raised and planted out amongst us; and then, with as much brevity as possible, lay before you such hints, as I have found to be an improvement on this practice.

The usual way is, to gather their cones in winter, and sow the seed about the end of April or the beginning of May; but as at that season of the year, the sun has not power sufficient to open the cones, they are obliged to lay them before a hot fire, or upon a kiln, which, if not done with great caution, and the heat made very moderate, they totally destroy a great part of the seed, or at all events, much weaken it. A little observation, and less philosophy, will be sufficient to show this practice is opposite to nature, and very prejudicial to vegetation, as is the general manner of sowing the seed, which is extremely thick, on beds of well-prepared earth, and covered about a

quarter of an inch deep, where they are to remain two years.

Such as are not purchased, from the seed-bed, the gardeners remove to the nursery, where they are also planted very thick, and from thence sold the next or the following year, as the demand happens to be for them.

Much the greater number of Scotch Firs are planted out in Scotland, from the seed-bed, and such are generally (though very injudiciously) chosen from the most hungry barren soils, and bleak exposed situations, when, from the natural hardiness of the plant, in kindly moist seasons, they frequently grow; but, should the following May, be attended with cold withering frosty winds, and June with a drought, (a circumstance, from fatal experience, we too often find to happen in this climate,) they generally perish.

This, however, though too frequent, is not universally the practice, as several gentlemen, of knowledge and experience in gardening, plant great numbers of them from the nursery, at three and four years old, when, if they have been tolerably well cultivated, it must be a very bad soil and season indeed, if they do not succeed.

Such is the common method of propagating this plant: It remains I should direct its culture, in the way I have succeeded, with more than the common success.

I have observed, that the seed of this tree is rarely, if ever, procured in full perfection, and that from the practice, I have just mentioned, of curing
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the seed. This evil is only to be prevented, by not gathering the cones before they are fully ripe, and to obtain from them the seed, without committing any violence on them.

The cones of the Scotch Pine, like those of the Larch, advance in maturity during the whole winter, and like them, should not be gathered until spring, though their subsequent management is much more simple, being with more ease divested of their covering.

Let the cones therefore be gathered in March or April, from the fairest and most flourishing trees of the red kind, (such as have fallen from them, are the best) to be kept in a dry place until June, July, or August, as the weather sooner or later becomes warm : At the most favourable of these seasons, spread them on a mat or canvass, exposed to the sun during the heat of the day, take them under cover in the evening, and protect them constantly from the rain and dews. In a few days the cones will expand, and the seed rattle within them: When in this state, put them in a wire-sieve, and shake them over a cloth, to receive the seed that will fall by this operation ; repeat the spreading of the cones in the mid-day sun for several days, as well as shaking them in the sieve, until on opening some of the cones, you find they contain no more seed that are plump and fresh. Having thus procured the seed, let it be kept in boxes or bags, in a dry room, until the season of sowing.

By collecting your seed in this manner, you will have them unhurt, ripe and generous, a pound of which will raise more plants, than six of that usually

ally bought from the seed-gatherers: Nor is even this the greatest advantage; for every gardener knows, (or at least ought to know) that on the good quality of the seed, depends the future luxuriant growth of the plant, for a diseased or a weak parent, is not likely to produce a healthy and vigorous offspring. It is much to be wished, this circumstance was more attended to, than it usually is, both in the animal and vegetable creation.

I shall proceed to direct that management of the seed, from which I have found uncommon success, in the culture of this useful plant; and the public may be assured, I shall not advance any thing on this subject, the benefit of which, I have not been fully sensible of, from long and frequent practice.

From sowing the Fir seed so late in the season, as they commonly do, they do not appear above ground, until the weather comes in warm, when the greatest drought usually begins in this country; from this circumstance they must either be regularly watered, or whole quarters of them will perish in a few days. Every nurseryman of the least observation must acknowledge this, as it has happened often within these twenty years past; and we need go no farther back than the year 1771, for a fatal instance, when not only the Scotch Firs, but all the other evergreen tree-seeds were burnt up, and in many situations even watering did not preserve them. This is not the only misfortune that frequently attends late sowing: There is another, and a very great one, that neither a kindly season, nor a good soil, will prevent, that is, the small growth of the plants;
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from which, if the succeeding winter proves severe, the greatest part of them will either be killed, or forced out of the ground.

To prevent these frequent misfortunes, I advise sowing the seed about the middle of March, or as soon after as the land is dry, and the weather favourable, in shady borders of generous loose mould, at the rate of a pound of good seed, to a bed of sixty feet long, by three and a half broad. A covering of about a quarter of an inch thick, will be sufficient for the plants to spring through; but should they be covered at first to the depth of half an inch, just as the seed begins to vegetate, half of the quantity may be gently raked off, with a short toothed rake, which will be a material improvement, as by it the surface, which otherwise would have been hard and battered, will be rendered loose and mellow, remove every obstruction, and encourage the plants to make their appearance. This circumstance is not sufficiently attended to, notwithstanding its importance in the culture of plants, and should not only be practised with all the evergreen tribe, but indeed with all tree-seeds in general, as it greatly increases their number, and accelerates both their present and future growth. Many thousands of plants, in stiff ground, and in dry seasons, are smothered, being unable to make their way through a hide-bound surface; and however general this neglect, it is too obvious to require any further explanation, as every gardener of common sense, and the least attention, must plainly perceive, that the precaution recommended, is assisting nature in her operations.

I must likewise observe here, an almost universal error in the sowing these seeds, which is, that
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if the nurseryman has them not as thick as a bed of Cresses, he esteems them an insufficient crop. This, however, is a most barbarous and even dishonest practice, and the bad effects of it have, more than any other circumstance I know, retarded the success of our plantations. The plants thus raised, are starved and dwarfish, and, for want of air, rendered so tender, as often to perish, with the first hard weather; or if, from some favourable circumstances in the soil, or situation of the place, they should live, their shoots are poor and languid, their roots carrotty and with bad fibres; in which state they will continue for a while, until cut off by a hard winter. Many gentlemen, who have purchased large quantities of firs raised in this manner, imported from the north of Scotland, and sold for less than half the price of good plants, have paid dear for their intended frugality, and are now but too sensible of the truth of what is here observed. Nor is this practice confined to the north of Scotland only; for, I am sorry to find, it has even reached the capital of the kingdom, where several people have started up, and assumed the character of nurserymen, unbred to, and unknowing in the meanest branches of gardening. These pretenders have adopted the system of their more northern brethren, and impose on the ignorant and unwary, by selling their suffocated trash, (which they may well do,) under the rate of good plants; whence they have injured the fair-dealing intelligent nurseryman, whose heart disclaims receiving money by so iniquitous a practice, which would not only counteract the improvement of his country, but discourage the spirit of improvement so liberally carrying on, not less for the pleasure of gentlemen of property, than
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the giving employment to the lower class of people. This honest information, it is hoped, will not be unattended to, by such gentlemen, as may engage in the improvement of their estates, in this way.

As soon as the plants begin to appear above ground, should the weather prove dry, and without frost, let them be watered in the mornings early, once every four or five days, for five or six weeks, by which time they will have acquired sufficient roots to continue them growing vigorously the remaining part of the summer, and require no further labour, than to keep them clear of weeds.

From the beginning or the middle of the following April, transplant them from the seed-bed (cutting away a little of their downright roots) to other shady well-prepared borders, plant them in rows fifteen inches asunder, and six or seven in the row, and give them three or four plentiful waterings, and soon after planting, should the weather require it. The succeeding October and March, spade over the ground between the rows, which will encourage the spreading of their fibres, here let them remain two years from their removal; at which time, these plants (from this culture,) will have such abundance of roots, with bodies so thick and well-proportioned, that they will encounter all difficulties, and succeed in the worst soils, and coldest situations, much better than seedlings.

For the purpose of giving speedy shelter to plantations of the finer trees, by large firs, let these plants be again removed to another, nursery, and planted in rows, three feet asunder, and eighteen inches in the row, where, after standing two years longer, and digging the ground as formerly, they

they will transplant with absolute safety, and grow as freely, as the younger plants, notwithstanding the general prejudice that has been conceived against the old Scotch Fir, which has been occasioned, by their not being seasonably transplanted, and otherwise properly cultivated.

In removing these plants, either from the seed-bed, or from one nursery to another, I must advise that a simple and easy precaution, may never be neglected, which is, to have standing by you, a tub with water and earth, mixed to such a consistence, as that a considerable quantity of it, will adhere to the roots of the plants, when immersed in it: The moment they are raised, let them be plunged in the tub, as deep as they stood in the ground, to continue for several hours, when they will have imbibed a quantity of moisture sufficient, to enable them to continue in a growing state, and resist the drought till they have struck root, when they will shift for themselves. By attending to this practice, I have often succeeded, in the removal of Firs in unfavourable seasons; but when it has been neglected, they have been generally cut off.

Though I have recommended the removal of the Scotch Fir or Pine, at a year old, yet I mean it should be understood, under certain restrictions, and only practised, when the seed is early sown on a good soil, as here directed, and when from a favourable season, they have become well-grown plants; but if otherwise, and these rules have not been attended to, but on the contrary the ground poor, the sowing late, and too thick, the plants will be small, stunted, and unable to bear transplanting, so must of course remain another year; but even then, they will be much inferior, to those of a year old.

old, sown seasonably on good land and moderately thin. There is but one remedy that I know of, for the recovery of thick-sown and stunted plants, which is, to go over the beds carefully when a year old, and thin them so as to leave the remainder at proper distances. This, perhaps, a gentleman may prevail on his gardener to do, but I fear it will be but ill-relished by the nurseryman, who regards his crop more for number, than its value in goodness, as by the practice here recommended, a great number of sterile plants are to be cast away, in order to procure some good ones.

It has been long disputed, whether there are more sorts than one of the Scotch Pine or Fir, and it is generally asserted, that the difference we find in the wood, when cut down and polished, is only owing to the age of the tree, or the quality of the soil, where it grew; but this assertion I am obliged to believe is not just, and proceeds from the want of sufficient observation, as I have seen many Fir trees cut down of equal age in the same spot, where some were white and spongy, and others hard, which is conclusive to me, that there are two distinct species of them; and indeed the difference of colour may be easily discovered, by any one who walksthrough a newly-pruned plantation, even of young trees. But having dwelt sufficiently long on the Scotch Pine, it may be necessary to consider some of the other sorts, and these the most beautiful kinds of the Pine tribe.

The second, third, fourth, fifth, sixth, seventh, and eighth sorts, may all be propagated after the same manner. Those have carrotty deep roots, with few fibres, which makes it indispensibly necessary, to remove them at one year old, when their
roots

roots are tender, and will more readily admit of being shortened, than when older, very few of them succeeding after their removal from the seed-bed above that age. This being the case, you must endeavour to render the plants as strong as possible the first year. The seeds of these Pines do not rise near so soon as those of the Scotch, therefore they may with safety be sown a fortnight earlier, that is, about the beginning of March. Thus sowing them as early as the season will permit, is the only certain way of procuring strong plants. The ground then being prepared in a shady well-sheltered situation, sow the seed in shallow drills made with your hands, a foot asunder, and moderately thin in the drill. This indeed will employ much more ground than sowing them in beds, but the far better quality of the plants will outweigh that consideration; for, as most of the Pines come up, with heavy tops and slender bodies, they are equally subject to be dashed to pieces, by the winter's winds and rains, or forced out of the ground by the frosts; but by this method of sowing, the earth can be drawn up to the plants with a small hoe, from time to time, so as to secure them from the severities of an ordinary season.

The next spring, when the buds begin to swell, raise the plants, cut away a little from the extremity of their downright roots, and observe immediately to immerse them in the water and earth some hours, as directed for the Scotch Pine; then plant them in a sheltered shady border in drills, cut out with a spade, at eighteen inches asunder, and seven or eight in the drill; water them at planting, and continue to do so moderately, as the weather may require, until you see them in a free growing state; let them remain here two years,
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taking care to keep the ground clean and mellow in the surface, and spade it over between the lines in autumn and spring.

The four kinds last mentioned, are somewhat more tender for two or three years, but will afterwards bear very well the greatest severity of our winters: I would therefore advise their being
 • sown in pots of fine rich loose earth, and to be protected from the sun in summer, and all violent rains, but to expose them to the sun during the winter and early spring months, under the protection of a frame without glasses, over which a mat may be occasionally thrown in severe weather, which must regularly be removed on its becoming temperate.

The following spring, as soon as the buds begin to swell, plant them either within an old frame without glasses, or in a bed arched over with hoops, to admit of being covered with mats in bad weather. In these beds or frames, place them in lines a foot asunder, and seven or eight inches in the lines: for five or six weeks after planting, let them be shaded from the mid-day sun, until well established, and in a free-growing state, after which they will require no other attention than to be taken care of in stormy weather, and that only after the first year from their removal, as, in the month of May of the second, the frames may be taken away during the summer, to be replaced in winter, but not covered, unless in a very severe storm,

From these quarters all the Pines may be removed the succeeding spring, to where they are intended to remain, in large plantations; but
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for smaller designs, and for an immediate show, they may be transplanted with safety, at the height of six or seven feet, and even larger, if they have been transplanted every second year, and cultivated as here directed.

The first mentioned seven kinds are inhabitants of the mountains, and delight in a hard rocky soil; the next four sorts affect a deep and moist ground; and the New-England Pine, the most beautiful of all the tribe, loves a generous, deep soil, but not wet, either naturally protected from violent storms, or under the cover of some plantation, otherwise, as it advances in height, it loses its shining verdure, and becomes ragged and unsightly; but interspersed with other trees, in a soil it loves, and at a proper distance from them, it grows luxuriantly in this climate, and will soon become a noble plant. It is the most patient of all the Pines in transplanting, either young or old, as its roots tend less downward, but produce abundance of spreading fibres. I have removed them at twelve feet high with the greatest success, though even these had not been cultivated as I have directed for that purpose.

The uses of the timber of the Scotch Pine are universally known. All the other kinds are closer, harder, and more lasting: But that of the New-England is much more beautiful and valuable than any of the other sorts; it is of a darker colour, polishes very smooth, and has some resemblance of Cedar.

CHAPTER XXVI.

THE FIR TREE.

A Description of its Flower and Seed.

The male flowers are disposed in a loose bunch, having no corolla, but many stamina, joined in form of a column at their base, but separate above, having erect summits. The female flowers are collected in an oblong cone, each scale including two, which have no corolla, a small germin with a single stigma; these are succeeded by membranaceous winged seeds.

The SPECIES are:

1. The Norway, or Spruce FIR TREE.
2. The black American Spruce FIR TREE.
3. The white American Spruce FIR TREE.
4. The Silver FIR TREE.
5. The Balm of Gilead FIR TREE.
6. The Hemlock Spruce FIR TREE.

THOUGH all the writers on gardening I have read, make no material distinction in sowing or in the future culture of the Fir from the Pine-tree, yet, from my certain experience, a very different practice ought to be observed, particularly, with some of the sorts, and that for the most obvious reasons. The Pine, the New-England only excepted, have downright roots with few fibres. These roots, at transplanting, must necessarily be reduced, which, if done after they become hard and woody, will destroy the greatest part of them. The roots of the Fir tree, on the contrary, spread

near the surface, produce abundance of fibres, and do not the first year grow to near the size of the Pine in general; from hence, I think, nature plainly points out to us, the propriety of the next two years culture in the seminary, and even with advantage, which, to the Pine would prove destructive: I shall therefore describe the practice I have found most successful.

About the middle of March, sow the first, second, and third sorts on beds, in a shady well-sheltered border, but much thinner than the Pines, as they are to remain two years.

The three remaining sorts do not rise by a fortnight at least, as soon as they do; and as they make very little progress the first year, every art and means of industry should be used to promote their growth, otherwise many of them will be forced out of the ground, and the weaker plants entirely killed, should the following winter prove severe. The best security against all these common accidents is to sow early, therefore, let them be sown a fortnight sooner than the three preceding kinds, that is, by the beginning of March, provided the weather will permit. The ground intended to receive the seed of these plants, cannot be too rich in its first state, or too finely prepared; it must also be loose and dry, which, if not originally of that quality, must be rendered so, by mixing with it sand, and elevating the beds six or seven inches above the alleys, the better to carry off any moisture,

The Balm of Gilead, and Hemlock Spruce, are a little tenderer at first, than the other sorts, and will

will be much aided in their growth, if the beds are hooped over, and covered with mats for five or six weeks, after the plants appear above ground, both in the middle of the day when the sun is warm, and at night when the air is cold or frosty; and, during that time, they will require a gentle watering every second evening, when rain has not fallen.

On sowing the seed of the different kinds of Firs, neglect not to press down the beds with the back of a spade. This makes the surface smooth and level, prevents the seed from being irregularly scattered, on drawing on the earth with the rake, and is in several other respects of advantage.

As these plants bring up the husk of the seed on their tops, the small birds, who are very fond of them, will destroy the greatest part, if they are not protected. The best method I know of, is to procure a parcel of old fishing nets, to spread over the beds, supported by cuttings of copse-wood, or the prunings of trees, laid across stakes; the nets for this purpose, are to be purchased at any seaport, for a mere trifle.

In the autumn after sowing, go over your beds, and, with your fingers, carefully pick off all mossy hard-crusted particles, replacing them with an equal quantity of the richest best prepared soil; over which sift some chaff, or rather saw-dust that has lain some time, and has lost its fiery quality. This will keep the plants warm, and prevent the ground from swelling with the frost, which, if it does, is apt to cast them up: It will likewise be necessary in hard frost or violent rains, to throw a mat over the two last kinds, but to be regularly uncovered in mild weather.

In the succeeding spring, and during the months of May and June, the plants will be much invigorated by frequent waterings, and in autumn let the beds be treated as just directed; for though the seedlings are from this time until the spring in a state of rest, and can, from no culture, be assisted in their growth until its return, yet the musty parts contracted on the surface, must be carefully taken off, otherwise the winter rains will wash them into the beds, which will contaminate them, and communicate a disease to the plants, from which they will very slowly recover. This circumstance, though in general little attended to, is yet of the greatest importance to all seedling trees.

In the spring, when the plants are two years old, and their buds begin to swell, let them be removed from the seed-bed, and treated as has been directed for the Pines of one years growth; but as all the different kinds will transplant, at a considerable size, with the greatest success, when properly managed, I shall add a few lines on that subject, as a nursery of the fine kinds of firs, eight or ten feet high, would be a very valuable acquisition, either to a private gentleman, or a nurseryman; and few men of fortune, I believe, would scruple bestowing a little extraordinary expence, to cover a naked field, shelter a new planted garden, or adorn a new-building with such pleasing ornaments.

These plants, being now four years old, must be transplanted to another spot of good land, and placed in rows two and a half feet asunder, and fourteen or sixteen inches distant in the row; water them at planting, and continue it once a week, five or six times, when rain does not fall, keeping the
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the ground clear of weeds in summer, and mellow by autumnal and spring digging, in which situation they may remain three years.

In the following spring, let them be again transplanted at the usual season, moderately shortening their straggling roots, and plant them in rows four feet asunder, and two feet in the row, here they are to be kept three years longer.

But if it is desired still to have them yet larger, remove them once more, and plant them at six feet asunder every way, to remain two years, but not above three; as by this culture, the three first kinds will be from fourteen to sixteen, and the Silver Fir from ten to twelve feet high. These trees by this management, will rise with such abundance of earth surrounding their roots, as will prevent their receiving the least injury at removing, nor will their future growth, be in the smallest degree retarded by it. Particular directions for executing this operation is unnecessary, as the rules prescribed for large English Elm, and other deciduous trees, will answer for the Pine, as well as for most others, in respect to making the pits, and preparing the soil: However it may be necessary to observe, that these, and other large Evergreens in general, require more frequent, tho' but gentle waterings, at and soon after transplanting, than the deciduous kinds;—to which I must add, that they are not to have a single branch cut away at this time, but every operation of this sort, must be executed the year before, which can be no more, than to prune their under-branches, to a foot or eighteen inches from the surface; in which you are further to proceed, when the trees have stood two years longer,

longer, when their trunks may be further cleared, by annually taking away a tire of branches, until their trunks are cleared to the intended height, which I think (in woods for timber only excepted) ought not to be more than ten or twelve feet from the surface, their greatest beauty consisting in the graceful wave of their luxuriant branches, from the top to near the surface of the earth.

The three first mentioned Spruce Firs will grow tolerably well in dry, gravelly, or rocky ground, but much more affects that of a good depth, though very coarse, and so barren as scarcely to produce any vegetables.

The Silver Fir, which I have ever thought the most magnificent tree, of all the Evergreen tribe, that our climate produces in full perfection, should not be planted in an hot, dry, or rocky situation, as in such they not only soon lose their top-shoots, but their under branches become ragged, and, instead of that lively shining verdure peculiar to them, in a soil they like, they become of a pale languid hue; nay I have known trees above twenty years planted in such soils, entirely destroyed by one hot dry summer, notwithstanding they in other respects, were the least delicate of any other plant, in the choice of their food; the largest and most flourishing of them, I have ever found growing in this island, are generally on a sour, heavy, obstinate clay, compounded of different qualities and colours; where, perhaps, for the first ten or twelve years, they will not advance so fast as several of the other tribes; yet in twenty, they will outgrow them, and continue that advantage, until they arrive to their greatest magnitude.

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These trees, like others of the common sorts, intended for timber, should not be planted together in thickets, as they require a free circulation of air, and in that situation their intermingled branches would destroy each other.

The Balm of Gilead Fir, notwithstanding it is described as growing to a large size in America, and ranked in our catalogues amongst the tallest trees, yet in this climate they never come to any great magnitude. It requires a generous deep-feeding soil, and sheltered situation, to which, from its singular beauty and elegance, it is justly intitled, and merits our greatest attention and care.

The Hemlock Spruce Fir is a pretty plant, but delicate, and, to succeed well with us, must be indulged with a good soil, and warm situation : It will likewise be improved, by tying its leading shoot to a stake as it advances.

Though I have directed the spring, as the most proper season for planting Firs and Pines, which, it certainly is for seedlings, and the tender sorts, —yet I must beg the reader's further indulgence, to recommend what will be found, if generally attended to, the greatest improvement ever yet practised, on most of the Evergreen species. The experiment is both cheap and easy, and only wants to be put into execution, to recommend its self to every planter in Great Britain ; which is no more than this, that instead of planting the hardy kinds at a foot or more in height, as soon as they have perfected their shoots in spring, to plant them in August. For a succession of years, I have planted many thousands at that season, without
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being once disappointed in my most sanguine expectations; but before this became my practice, I had great losses in unkindly springs, and dry summers, though all possible care had been taken: In this I cannot suppose myself singular, and I dare say, it has been experienced by every extensive planter, whose situation has been similar to mine. Though experience is the only unerring guide in the pursuits of nature, yet there appears many natural reasons to give the preference to this season: The shoots of the plants are now ripened,—the ground still warm, and pregnant with vegetation, — and by working the earth, that vegetation is as it were artificially put in a fresh and more vigorous motion,—and rain at this season is seldom or ever wanted;—all which conspire, to mark it highly favourable for new plantations. From this happy temperature of the earth at this season, the trees strike root immediately, not having any thing to oppose them until the approach of frost, by which time they will be sufficiently established, and strengthened to resist its power. To all these advantages, may be added that saving of time and labour, which a spring operation would require, of watering, and particularly in the summer months, which the choice of the season here recommended precludes. And to this may be added, the opportunity given to attend the plantations, from the lesser number of operations, and diversity of works, necessary in the autumnal, than the spring season.

Give me leave, before I conclude this interesting chapter, to observe, that I have been often surprised to find that the Scotch Pine or Fir, should be the only Evergreen used to any great extent, for every soil and situation, though
incapable

incapable of becoming the most desirable of Forest-trees of this tribe. In mountainy, and rocky situations, and in chalky, sandy and gravelly soils, not any better can be used; but in hungry deep till, and clay, the Spruce Fir will much surpass it, and is a tree of much greater beauty, of more valuable timber, and propagated with the same facility. We are very negligent of our interests, in not planting them where the soil invites, and more particularly, as they would contribute both to our pleasure and profit, in an extensive way, and in situations that now appear a cold and gloomy tract of inhospitable land. For shelter to gardens or other plantations, in cold situations, I know no plant so proper, as the Norway Spruce Fir: They make strong fences, and grow amazingly fast, sheep or cattle do not annoy them; in spring as soon as they begin to shoot, and the weather is moist, they are to be clipped thin in their tops, to come down gradually thicker, as they approach to the bottom, when they will continue many years beautiful and in full verdure, as by this form no part will be over-shadowed, but all equally enjoy the influence of the sun and air.

The different kinds of Firs are injured by lopping off their wood when old; therefore, they ought to be pruned when their branches are young and tender. The best season for pruning them, is, as soon in autumn as the sap is at rest.

Of SCOTCH PINES; by James Farquharson, Esq; of Invercauld. From the Appendix to Mr. Pennant's late Tour in Scotland; introduced by the Publisher of this Edition.

IT is generally believed that there are two kinds of Fir trees, the produce of Scotland, viz. the red or resinous, a large tree of a fine grain, and hard solid wood: the other, a white wooded Fir with a much smaller proportion of resin, of a coarser grain, and a soft spongy nature, which never comes to so great a size, and much more liable to decay. At first appearance, this would readily denote two distinct species, but I am convinced that all the trees in Scotland, under the denomination of Scotch Fir, are the same; and that the difference of the quality of the wood, and size of the trees, is entirely owing to circumstances, such as the climate, situation, and soil they grow in. The finest Fir trees, appear in the most mountainous parts of the Highlands of Scotland, in glens, or on the sides of hills generally lying to a northerly aspect, and the soil of a hard gravelly consistence, being the natural produce of these places; the winged seeds are scattered in quantities by the winds, from the cones of the adjacent trees, which expand in April and May, with the heat of the sun; these seedlings, when young, rise extremely close together; this makes them grow straight, and free from side branches of any size, to the height of fifty or sixty feet, before they acquire the diameter of a foot: even in this progress to height, they are very slow, occasioned by the poorness of the soil, and the numbers on a small surface,

surface, which I may say makes them in a constant state of war for their scanty nourishment, the stronger and tallest by degrees over-topping the weaker, and when the winds blow they lash against them; this assists in beating off any horizontal branches that might damage the timber with knots, as well as by degrees crushes the over-topped trees. In such state of hostility they continue struggling, until the master trees acquire some space around them; then they begin to shoot out in a more bushy manner at the top, gradually losing their spiral form, increasing afterwards more in size of body than height, some acquiring four feet diameter, and above sixty feet of height to the branches, and fitting for the finest deal board. The growth is extremely slow, as is evident from the smallness of the grain of the wood, which appears distinctly in circles, from the centre to the bark. Upon cutting a tree very close at the root, I could venture to point out the exact age, which in these old Firs comes to an amazing number of years. I lately pitched upon one of two feet and a half diameter, which is nearly the size of a planted Fir, of fifty years growth, and I counted exactly two hundred and fourteen circles or coats, which makes this natural Fir above four times the age of those planted. Now as to planted Firs, these are raised first in dressed ground from the seed, where they stand two seasons or more, then are planted out in the ground they are to continue in, at regular distances, have a clear circumference round them, for extending both roots and branches; the one gives too quick nourishment to the tree, which shoots out in luxuriant growth, and the other allows many of the branches to spread horizontally,

tally, spoiling the timber with knots; besides, this quick growth greatly encreases these yearly circular coats of wood, but forms them of a coarse grain, and spongy nature. Their juices and their resinous balm, never sufficiently ripen by this quick vegetation, so that the plantation decays before the wood acquires age, or a valuable size, and the timber when used in work has neither strength, beauty, nor duration. I believe the climate has likewise a great share in forming the nature of the best woods, which I account for in the following manner. The most mountainous parts of the Highlands, particularly the northerly hanging situations; where these fine Fir-trees have a much shorter time for vegetation, than a more southerly exposure; or the lower open countries, which are shaded by high hills from the rays of the sun even at mid-day, for months together, so that vegetation continues longer in a torpid state here, than in other places of the same latitude. This dead state of nature for such a length of time yearly, appears to me necessary to form the strength and health of this particular species of timber. No doubt they may at first show a gratefulness for better soil and more sun, by shooting out spontaneously, but if the tree is so altered by this luxury, that it cannot attain any degree of perfection fit for the purposes intended, the attempt certainly proves vain.

What has been just observed, is not intended to dissuade gentlemen from planting the Scotch Fir, but to encourage such as are possessed of the soil and situation above described, to make a proper use of them, whom I would not advise to plant
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FOREST - TREES. 175

in lines, but irregularly, and thicker than common, when the trees will come to be of equal size and value, with those planted by nature. In confidence of this, I have planted several millions on the sides of hills, out of the reach of feed from the natural Firs.

CHAP.

C H A P T E R XXVII.

T H E C E D A R T R E E,

A Description of its Flower and Seed.

N°. 1. *It hath male and female flowers growing separate on the same tree. The male flowers are disposed in a scaly catkin; these have no petals, but a great number of stamina, which are connected in a column below, but are separated at their points, and are terminated by erect summits. The female flowers are disposed in a conical shape, having no petals; these are placed by pairs under each scale, having a small germin, supporting an awl-shaped style, crowned by a single stigma. The germin afterward becomes a nut with a membranous wing, inclosed in the scale of the cones.*

N°. 3 and 4. *It hath male and female flowers in different plants, and sometimes at separate distances on the same plant. The male flowers grow on a conical catkin; the flowers are placed by threes, two of them fastened along the common tail opposite, terminated by a single one; the scales are broad, short, lying over each other, and fixed to the column by a very short foot-stalk. The flower has not any petal, but three stamina in the male flower, which are joined in one body below, having three distinct summits, adbering to the scales of the lateral flowers. The female flowers have a small three-pointed empalement sitting upon the germin, which is permanent; they have three stiff, acute, permanent petals; the germin sitting below the empalement, supports three single styles, crowned by stigmas. The germin afterward becomes a roundish berry*

berry, inclosing three stoney seeds, which are oblong and angular on one side, but convex on the other.

The S P E C I E S are :

1. The CEDAR of Libanus.
2. The red Virginian CEDAR.
3. The white-berried Virginian CEDAR.
4. The CEDAR of Bermudas.
5. The TREE, or Swedish Juniper.

THE cones of the Cedar of Libanus were formerly brought to Britain from the Levant ; but the English trees have since produced abundance, and of a better quality than the foreign. The late Mr. Philip Miller, (whose memory I shall ever revere, as my worthy friend, and most indulgent communicative master), from his naturally acute and ingenious observations, as well as having four of the finest plants in England under his direction, (now growing in the Physic-garden of Chelsea,) had an opportunity of knowing the nature of this tree, better than most men amongst us ;—He hath observed, that they produce more and better ripened cones in hard winters, than in mild ; and that the English trees produce more and better seeds than the foreign, of which I have certain demonstration, having, from his bounty, annually received, a present of a considerable number of his cones, for above twenty years, which never failed, while those purchased at a considerable expence from abroad, often did.

These noble and magnificent trees at Chelsea, were for several years under my almost daily inspection, so that I could not but have a respectable veneration for this plant; of which, I have raised more than any other man ever did in Scotland, as well as being the first who made them known in this part of the kingdom; in both of which I was assisted by Mr. Miller, (whose friendship, I have already acknowledged,) which also enabled me to make such different experiments on their culture, as properly to direct it; of which they will not have the least occasion, when arrived to their third or fourth years growth.

The way that was first practised for procuring their seed, was by splitting the cones length-ways thro' the centre, with a sharp piece of iron, and to pick them out with your fingers, which may be easily done; after the cones have been exposed some hours before a warm fire. Should the cones be two years old, they will emit their seed more freely than when just gathered, and the seed equally good.

The best soil to raise these plants in, is that of a rich old cow-pasture, which, if not naturally of a light quality, must be mixed with a fourth or fifth part of sea-sand, or that taken from the sides of rivulets, to be well blended together for some months, before it is used. I have already mentioned that this tree, will not require any attention after it has arrived to the age of three or four years, nor is it very delicate from the beginning; yet at the same time, it is absolutely necessary to give them abundant nourishment at first,

first, in order to raise a fair and vigorous plant; for if they once become dwarfish, stunted, or to lose their leading shoot, no art will be possible ever afterwards to restore them to a good figure: Therefore, to raise a number of plants, is not a thing so desirable, as to raise them healthful and of a comely figure, and which cannot be done without having both skill and attention. Therefore, in order to effect both, observe the following directions:

Having prepared your soil as just directed, which must be in a sheltered situation, exposed only to the morning sun, place on it an old hot-bed frame, and lay in it to the depth of seven or eight inches of this compost, in which sow the seeds the beginning of March, which must be in shallow drills made with your finger, a foot or fourteen inches asunder. About a fortnight after sowing, should the weather prove dry, give them a very gentle sprinkling of water every second evening while it continues. In about six weeks the plants will appear above ground, when, if the nights are frosty, which they often are at this season, let a mat be thrown over them in the evening, and taken off next morning or in the forenoon, should the rays of the sun have dispelled the frost. As soon as the weather becomes mild; but continuing dry, the waterings must be regularly continued, though in a less plentiful degree; which will be much safer to do in the mornings while the frost lasts; when, as soon as it is gone, they will benefit more by the evening waterings.

The Cedar comes up, and continues for the first year, to show remarkable tall and thin bodies, with heavy tops, inclining downwards: They have

M 2 30. 101 1/2 ft. high downright

downright roots, with very few fibres ; and penetrate so little into the earth, that I have seen great numbers of them laid flat, and beaten entirely out of the ground by the rain, and even in the summer months. To remedy this evil, no method is equal to occasionally drawing up the mould about their stems, as they advance, which will not only preserve, but much invigorate their growth. This being attended to, they will require no further care until next season, but to cover the frame with a mat in violent rains or severe frosts, never omitting to uncover them in mild weather.

The following spring, prepare another spot in the same manner as you did for the seed, but let the compost soil be twelve or fourteen inches deep, then with a very sharp knife, cut off the points of their downright roots, which are very tender, and would otherwise have their fibres tore ; immerse them about half an hour in such pap as has been directed for the Pines and Firs, and plant them in beds of eighteen inches by a foot asunder. These beds must be hooped over, and a mat thrown over them during the heat of the day, which will much accelerate their taking root, and to expand their leaves ; the same care must be taken of them during the winter storms. It will be likewise necessary, the first summer, to draw a little earth to their stems, as directed for the seedlings, giving them frequent and gentle waterings during the growing season. By next spring the Cedars will be out of danger, the hoops and mats will be of no further use, the plants now requiring no other than common culture.

The plants being now three years old, will be sufficiently hardy for removing to a common nursery ;

fery ; in any ordinary soil or situation, where they should be planted about the beginning of April, in lines two and a half feet asunder, and fourteen or sixteen inches distant in the line. At transplanting, continue to reduce the downright roots, and moderately shorten the smaller fibres, which will occasion their producing many more new roots, so as afterwards to rise with balls of earth closely adhering to them ;—it will however be necessary to steep them in the pap as just directed, and to water them at planting, which is to be continued every fourth or fifth evening for six weeks, the weather being dry. Here let them continue two years, when they may be removed to the places where they are intended to remain ; but should they be desired larger for future designs, they may be again transplanted to another quarter, and placed in rows five feet asunder, and three feet in the row, to continue three years longer ; when they will succeed equally well with the youngest plant, by seasonable and repeated waterings.

This culture which I have just directed is best for such gentlemen, as have only occasion to remove the plants from their nursery to the adjoining fields ; but for the nurseryman, who often send them to a great distance, I would advise the plants to be put in pots of nine inches diameter, when three years old, where, to be kept for three years longer, when they may be taken out with their balls of earth entire, to be wrapped up in a piece of mat, and sent with the greatest safety to the remotest corners of the island, and will keep several months out of the ground without suffering any injury.

As soon as the plants begin to grow freely, the leading shoot always inclines to one side : To re-

medy this, you must fix a stake by the side of each plant, and tie the leader close to it, until it has got to a considerable height, otherwise their branches will greatly expand, and prevent their growing tall.

To whatever height you intend clearing their trunks, (which ought never to be great, as much of their beauty consists in being cloathed with their noble verdant boughs to near the surface), let the branches be cut off when young and tender, as no tree I know of, resents more the lopping them off when old. Mr. Miller, in his Dictionary mentions, that two of the four trees he raised, having their branches trimmed, in order to admit the rays of the sun into the green-house, were so much checked by it, as, in above forty years growth, to be little more than half the size of the other two : A similar circumstance I have also experienced, for, having planted two Cedars about twenty-four years since, then three feet high, which grew amazingly fast for sixteen years, and promised to be noble plants, until an ignorant fellow cut off several of their oldest under-branches, since which they have advanced little or nothing in height, have lost their leading shoots, and become ragged and bushy.

Though these plants while young, require all the culture and shelter here directed, to make them handsome and vigorous trees, yet, when five or six years old, no plant will better endure our most severe seasons, or grow in a more forbidding, poor, and hungry soil ; the largest trees of them known in the world, being in the coldest and most exposed situations, covered with snow great part of the year ; from hence, it cannot be doubted, but
that

that they might become a great ornament, and valuable improvement, if more generally planted in Great-Britain.

The Antients had a great respect for the wood of this tree, of which they have given many legendary tales, it was much used in many of the glorious structures raised by them, which lasted to very distant ages.

The red and white Virginian Cedars are easily propagated, by sowing their berries in spring, on beds of a good mellow light soil, exposed only to the morning sun, and sheltered by trees, hedges, or walls. The seed will remain a year in the ground before it appears; during which time, the beds must be kept clean, and their surfaces loose. It will likewise be necessary, in extreme drought, to give them now and then a gentle sprinkling of water, which will keep the berries in vigour, for I have known many of them perish for want of this attention, and the remainder to come up weak, late, and irregular, after a very dry summer. As the plants make but a small progress the first year, they may remain two years in the seed-bed; when in the summer season, they must be frequently refreshed with water, and the surface of the beds dressed in autumn, as has been directed for other seedlings.

The following spring, remove them to another well-sheltered spot, of the same quality of the seed-bed, and plant them in lines, eighteen inches asunder, and nine or ten distant in the line; give them the same culture as directed for Evergreens of that age, and to remain for two years.

From hence remove them to another quarter of the nursery; in any ordinary soil and situation, cutting away the extreme parts of their roots, with such branches, as are crowded or ill-placed, and plant them in lines, three and a half feet asunder, and two feet in the line; let them be watered at planting, and frequently in dry weather, until past mid-summer, keeping the ground entirely clean; and here they ought to remain three years, when they will be of a proper size, to be planted out for good.

I would likewise advise nurserymen, to pot some of these plants, in the same manner as directed for the Cedar of Libanus, for the better conveying them to distances; they are a very fit tree to plant with myrtles, annual flowers, and other potted plants, to adorn the borders of the flower-garden or court-yard.

The Swedish Juniper, may be treated in all respects like the red and white Cedar.

The Bermudas Cedar when young, is more delicate and slower in growth, than the sorts mentioned; it will therefore be an improvement to sow their berries in pots, to keep them in the shade during the summer months, and under a frame the following winter. In the spring, when the seeds begin to vegetate, plunge the pots into a moderate hot-bed until the month of July, from whence they will advance more in one season, than two in their natural state, and make better plants.

The succeeding spring, plant each of them in halfpenny pots, and again plunge them in a hot-bed till July, when, in mild weather, they may by degrees

degrees be inured to the open air, and the following spring put into penny pots, where they should remain two years, when they ought once more, either to be shifted into two-penny pots, or planted in a well sheltered place in the nursery for three years, by which time they will resist our severest winters. Though this process may appear troublesome, it is only so in a very trifling degree to a gardener, who has proper convenience for executing his business. The Bermudas Cedar, being a plant of great beauty and elegance, is well worth a little extraordinary pains, to bring it soon to perfection.

The two Virginian kinds, and Swedish Juniper, will grow from cuttings, from which I have raised many handsome plants: This may be done the beginning of April, but the latter end of August I have found the most promising season. Being then provided with branches of one or two years growth, cut or tear them asunder at the joints, leaving to them a knob of the old wood, and clear off the leaves or small twigs, as far as the cuttings are to be planted in the ground, which, should be to about six inches; plant them in lines eighteen inches distant, in a shady border of rich loose earth, and refresh them with water as the season may require. The following summer, let the ground between the lines be kept loose and mellow, by frequent stirring it with a trowel; water them every third or fourth evening in dry weather, and the second spring they will be sufficiently rooted, to transplant to the quarters of the nursery, there to be treated as the seedlings.

The Bermudas Cedar will likewise grow by cuttings, tho' not so freely in the open ground; but
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let ten or twelve of them be put in a penny pot, and plunged into a hot-bed of tanners bark, they will root freely in one summer, and if taken out of those pots the succeeding spring, and put into others of the same size, and again plunged in the hot-bed for another summer, they will be larger plants than the seedlings at four years old, and may afterwards be treated as has been directed for them.

I have often heard gardeners boast that they have raised abundance of good plants from cuttings of the Cedar of Libanus. This knowledge I have been unlucky enough not yet to arrive at. I have tried every method for this purpose I could devise, but never could procure or did I ever see a healthful well shapely plant raised in that way : I can make them live, but in plants as well as animals, something more than bare existence, is surely wanted.

There are various other sorts of Cedars, but the rules here laid down for the culture of those mentioned, are sufficient for the whole tribe; only observing, that your seeds or plants that are brought from warm and temperate regions, require more aid and protection for some time, than those from the more inhospitable.

In the culture of the different species of the Cedar, as well as the Libanus, let it be an invariable rule, to prune and reduce them to their proper form, while their branches are young, when their wounds will immediately heal; but should this be neglected until they are old and woody;

FOREST-TREES. 187

woody, so great an effusion of sap will flow in the hot weather, as will render the trees weak and unhealthy, if not entirely destroy them.

There are perhaps no species of trees that succeed so well in so great a variety of soils, or in more opposite climates, than the Cedar does: It grows in all extremes, in the moist Barbadoes, the hot Bermudas, and the cold New-England; they thrive in the bogs of America, and the mountains of Asia. We have now many goodly thriving trees of them in Britain, and, from the almost incredible value of the wood, joined to the extraordinary beauty of the plant, we have every encouragement, to make more extensive and general plantations of them.

CHAP.

C H A P T E R XXVIII.

T H E C Y P R E S S T R E E.

A Description of its Flower and Seed.

It hath male and female flowers growing at distances on the same plant; the male flowers are formed into oval catkins, in which the flowers are placed thinly, among several roundish scales, each having a single flower. These have no petals nor stamina, but have four summits which adhere to the bottom of the scales. The female flowers are formed in a roundish cone, each containing eight or ten flowers; the scales of the cones are opposite, each having a single flower, these have no petals; the germin is scarce visible, but under each scale there are many punctures or spots, and a concave truncated apex instead of a style; this afterward becomes a globular cone, opening in angular target-shaped scales, under which are situated angular seeds.

The S P E C I E S are :

1. The common upright CYPRESS TREE.
2. The male spreading CYPRESS TREE.
3. The Virginian or deciduous CYPRESS TREE.
4. The American CYPRESS TREE, commonly called the WHITE CEDAR.

THE first, second, and third sorts, are propagated by sowing their seed about the middle of March, in sheltered shady borders of fine rich loose earth, which in five or six weeks will appear above.

above ground, when they must be regularly watered in the evenings of mild dry weather, every third or fourth night, and this continued, giving them but little at a time, until the middle of August; and if in the beginning of winter some sawdust is sifted over them, as directed for the Firs, it will much contribute to their preservation in severe weather.

The following spring, these plants when carefully attended to, will be six or seven inches high, when they must be moved to the same kind of soil and situation they were in the seminary, their downright roots shortened, and planted in lines eighteen inches asunder, and eight or nine inches in the line, as their roots naturally incline more to run deep, than spread beneath the surface, and as they are plants of a free growth, they are to remain no more than one year, when they should be upwards of a foot high.

Therefore, the succeeding spring, plant them in the common nursery, in lines three feet asunder, and eighteen inches in the line; water them at planting, and repeat it once every week, the weather being dry, until they have struck root and begin to grow freely, when they will require no further attention, than to keep them clean, and pointing over the ground between the lines in autumn and spring.

Having stood in this nursery two years, they may be removed to the places where they are designed to stand, which may be more properly done at this age than when older. These trees lose the greatest part of their beauty when much pruned; but their tops being very heavy, and branches
flexible,

flexible, the winds make so much impression on them, that I have known numbers of them blown out of the ground, that were moved when about six feet high, and had stood for two years: Wherefore it is best to give them a firm establishment in the earth, while the plants are young, when there will not be the same necessity to take away so many of their branches, as they would otherwise require.

The directions just given, is the easiest and quickest way of raising great numbers of them; but as it is no uncommon thing, for a hard winter to destroy whole beds, whether of one, and even two years growth, it becomes necessary to provide against such misfortunes, by sowing part of your seed in pots.

For this purpose, being provided with the rich loose earth, directed for the seed when sown in borders, about the middle of March set your seed in pots, to be covered to the depth of a quarter of an inch; place them in a sheltered situation, so as to receive the morning sun, until ten or eleven o'clock; keep them regularly but moderately watered, and in October, remove the pots under a frame, so as they may be protected in severe weather.

The succeeding spring, shake them out of these pots, and plant them in others of fourteen or sixteen inches diameter, each of which will contain from sixteen to twenty plants: Let them be placed in the shade until in a free growing state, and in winter removed under a frame, and to be afterwards treated as directed for the others of the same age.

The

FOREST TREES. 191

The American Cypress is somewhat more tender and slower of growth, than the sorts already mentioned, and they continue a year in the ground before they appear; I would therefore advise all these to be sown in pots, and treated the first season as the other sorts: But the succeeding spring, when the seed begins to vegetate, let the surface be cleared of all mouldy particles, and replaced by some fresh earth, sifted on in proportion to that taken off; the pots is then to be plunged into a moderate hot-bed until June, and afterwards to be gradually inured to the open air, placing them so as to be protected during the severity of the winter.

The following spring, set sixteen or twenty of the plants in other pots, in the same manner as you treated the former; observing they are to be again plunged in an hot-bed, to remain for about two months, and to be protected as before during the winter. In these pots they may be kept another year, without any more trouble than keeping them clean, and refreshing them with frequent waterings; after this, they may be moved to the nursery, and planted in lines three feet asunder, and eighteen inches in the line, where they are to remain for three years; and then to be transplanted to the places where they are intended to be placed for good.

These trees require a particular attention in pruning them; for if they are trimmed close, to any considerable height, their bodies will be so slender, as not to bear any proportion to their weighty tops: The best method therefore of ordering them, for the purpose of preserving their beauty, and to accelerate their growth, is, to cut away from the top to near the bottom, all ill-placed

placed forked branches, (of which this plant produces many), reserving only, at proper distances, such as are vigorous, and radiate directly from the body. This is an easy operation, and will require very little repetition, the tree not being disposed to put out young branches from the old stem. By pruning them judiciously in this manner, their thick branchy trunks will counterpoise their heavy heads, and render them able to resist the winds.

The first and second sorts affect a dry, sandy, or gravelly soil; the third, in Virginia, is generally found in moist swampy places, and sometimes in constant standing water; but the American sort, I have always found succeed best in a good deep-feeding earth, neither too wet nor too dry.

The Cypress has not only a fine effect when mixed with (though not crowded near) other trees, but is of any plants the most proper to place round or near buildings, where their upright pyramidal growth has a very picturesque appearance, without obstructing the view, and their dark-green leaves makes a most agreeable contrast, with the colour of the building. The Italian villas owe no small part of their beauty to the proper disposition of their Cypress trees, near their temples, and other ornamental works of architecture, which they have in their gardens.

Like that of the Cedar, many are the virtues and excellencies attributed to this tree, both by the ancient and modern writers. It is recommended for the improvement of the air, and a specific for the lungs, as sending forth great quantities of
aromatic

FOREST - TREES. 193

aromatic and balsamic emissions; for which reason, the antient physicians of the Eastern countries used to send their patients troubled with weak lungs to the island of Candia, at that time abounding with these trees, where, from their effects or the air alone, few failed to perfect a cure. The doors of St. Peter's church at Rome, were made of Cypress, which lasted from the times of Constantine the Great to Pope Eugenius the IVth, being eleven hundred years, and were then changed for gates of brass, and found entirely sound.

C H A P T E R XXIX.

THE *ARBOR VITÆ*, OR, TREE OF LIFE.*A Description of its Flower and Seed.*

It hath male and female flowers in the same plant; the male flowers are produced in an oval caskin. The flowers are placed opposite upon the common foot-stalk, each flower embracing it with its base; these come out of an oval concave scale; they have no petals, but have four stamina which are scarce discernible; their summits adhere to the base of the scale of the empalements. The female flowers are collected in a common almost oval cone, two flowers standing opposite in each scale; they have no petals, but have small germin, supporting a slender style, crowned by a single stigma; these are succeeded by an oblong oval cone, opening longitudinally, whose scales are almost equal, convex on the outside, and obtuse, each containing an oblong seed, with a membranaceous wing.

The SPECIES are:

1. The common *ARBOR VITÆ*.
2. The Chinese *ARBOR VITÆ*.
3. The *ARBOR VITÆ*, with striped leaves.

THE first of these may be propagated either by seed, layers, or cuttings; but as the seed lies a year in the ground before it appears, renders this manner of culture tedious, and the layers and cuttings making very good plants, the propagating

propagating them by seed is not generally followed.

When you increase them by layers, let that operation be performed in the month of March, watering them during the spring and summer months, more or less as the weather requires, which will much assist their rooting, when by the following spring they will be fit to be taken off.

If they are to be raised from cuttings, the culture directed for the red and white Virginian Cedars will best agree with them, which must be consulted.

The plants having got sufficient roots, transplant them to a border screened from the mid-day sun, in lines two and a half feet asunder, and one foot in the line; water them at planting, and continue to do so once in five or six days, should the weather prove dry, during the spring and summer months; keep the ground clean and loose about them, and point it over in autumn and spring; in which situation let them remain two years.

From hence remove them to any ordinary quarter of the nursery; cutting away but a little of the extremities of their roots; with such as are ill-placed and cross each other; plant them in lines three and a half feet asunder, and two feet distant in the line, ordering them as in their former quarters, and let them continue here three years, when they will be of a proper size to transplant where they are to stand for good. But if large plants are wanted, to make an immediate appearance in single trees, in groves, or in the wil-

dernefs, they muft be again removed to another nursery, and planted about five feet afunder every way, to ftand two, three, or four years longer; this tree is as patient on removal (when large) as any Evergreen; this I fpeak from experience, having tranfplanted them at ten and twelve feet high, with all the fuccefs that could be defired.

The Chinefe *Arbor Vitæ*, though it becomes a hardy plant, is, when young, a little more delicate and flow of growth than the other, neither does it root well by layers in lefs than two years, or take freely by cuttings in the open ground; therefore it may be advifeable to raife them from feed, when the culture directed for the American Cyprès, will in all refpects anfwer well.

It may likewife be proper to raife part of them by layers, which will be rooted in two years. In the beginning of April, let them be planted in penny-pots, and then, to forward their growth, plunge them into a moderate hot-bed of tanners bark, until the beginning of Auguft; after this, inure them by degrees to the open air, and place them under fome protection during the fucceeding winter. In the following fpring, take as much earth out of the pots as can be done without injuring the roots, replacing it with rich frefh mould; and in thefe pots let them remain a fecond year, watering them in dry weather every third or fourth day, when they may be taken out with balls of earth clofely adhering to them, and afterwards treated in refpect of foil, as the common kind; but, to preferve their beautiful verdure unfilled in a fevere winter, I would advife them to
be

be planted (thought not near), yet under the protection of other trees.

This tree may also be propagated by cuttings, setting ten or twelve in a penny-pot, plunging them into the bark-bed, as directed for layers, and giving them the same management.

The sort with striped leaves, may be increased by layers or cuttings as the common kind, but must be planted on a thin dry land, to preserve their variegation strong.

For the pruning of these trees, I can prescribe no better method than has been already directed for the Cypress, to which they have a near resemblance, and with which they will perfectly agree.

The common kind will grow in very indifferent ground, but mostly affect a deep sound earth, where they will soon make great progress; and though in winter their leaves are of a dull hue, yet, in spring and in the summer months, they are of a very chearful green, and the plants have a most agreeable negligent appearance.

The great value of the wood for bowls, boxes, cups, mortars, pestles, and various works for the turner and cabinet-maker, are generally known, and being a tree that bears our severest winters, and soon arrives to a middling stature, it justly claims our attention, and would become an improvement in our extensive plantations.

The Chinese fort, from the observations I have made, will not grow to so great a magnitude in this climate as the former; but being amongst the most beautiful of all the Evergreens, it well deserves encouragement in the garden, as well as the wilderness.

CHAP.

CHAPTER XXX.

THE *ILEX*, or EVERGREEN OAK TREE.

Being a species of the Oak, its character and description of its flower and fruit will be found under that Head.

The SPECIES are:

1. The Olive-leaved EVERGREEN OAK.
2. The narrow-leaved EVERGREEN OAK, with serrated leaves.
3. The Holly-leaved EVERGREEN OAK.
4. The round smooth-leaved EVERGREEN OAK.

THERE are several other kinds of this plant ; but being no other than seminal variations, are not worthy of being particularized.

I know no tree more difficult to transplant than the *Ilex*, as their roots, when not interrupted, run as straight down into the earth as a carrot, and with as few fibres ; so that for hedges, or large plantations, I would advise their acorns to be planted in the places where they are designed to remain.

If for hedges, let a border be well trenched, levelled, and raked the beginning of March, and make a shallow drill with a small hoe, placing the acorns in it at the distance of three or four inches, and covering them about two inches deep, keeping the surface mellow and clear of weeds. These plants make very little progress the first season, and will not then bear being cut under ground, but will

make ample amends ever after, by a luxuriant growth in any tolerable soil they like. After standing two years, carefully draw out such plants as stand too thick, leaving them from a foot to fifteen or sixteen inches distance. In the next spring, the hedges will require some correction : At this time go over them, first pruning off any spreading or cross-hanging branches near their tops, and afterwards let their sides be clipped to the bottom with shears ; but this must be cautiously done at first, and not too close to their bodies ; after which, by digging the borders for a few years, and shearing them annually, observing always to keep them light and thin in the tops, there is no plant I know of will so soon make warm and lofty hedges, to the height of forty or fifty feet, or so much improve a cold climate, and promote the growth of other trees.

If you intend a large plantation of these trees, either by themselves, or mixed with others, let the ground be well cultivated, and put four or five acorns in patches together, at such distances as you intend the plants should stand. The second April after planting, draw up such as are not well thriven ; and the third, you may begin pruning off any ill-placed branches, and part of the others where too thick.

The two years old plants, which you have drawn up, as soon as you have shortened their roots, plunge them into the pap for some hours, when they may be committed to a shady border in the nursery, and laid in lines two feet asunder, where, in a kindly season, and by giving them frequent and gentle waterings, some of them will succeed, and in this situation they may remain three years.

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I have been not a little diverted, to find writers on the culture of this plant sagely advise, to raise the seedlings with balls of earth, when by nature they are deprived of any fibres, and it is to art they are indebted for them, being of the tap-rooted tribe, so must come from the beds, destitute of any earth.

But in order to be furnished with plants that will remove with safety, sow their acorns on a good generous soil, in drills two and a half feet asunder, and three or four inches in the drills; let their growth be promoted by seasonable watering, and keeping the ground clean, sweet, and mellow: The second spring, clear away the earth from one side of the line of plants, about five inches deep, with a spade, and, with a sharp knife, at that depth cut the roots across, keeping the plant steady with the left hand, to prevent their being in the least disturbed, let the earth thrown up be immediately replaced, pressing it gently with your hand or foot. This practice should be repeated for three or four years, and the drills annually thinned as the plants increase in size; from this process being well attended to, I have had great success in removing numbers of them.

You may also raise the Ilex, by sowing their acorns in pots, where, after remaining three or four years, they may be taken out with the whole ball of earth about them, and planted with absolute safety where they are to remain: But this is an expensive and tedious method, as such would make but little progress, in comparison with these in the open ground; besides, the roots of the plants raised from seeds in pots, where they must remain for a long time, being all compressed in one cluster, cannot be so easily disengaged, therefore cannot furnish plants as luxuriant as these, that from time to time
have

have had their roots properly pruned, and room to extend them in the open ground. However unfavourable the sowing the seed of the Ilex in pots has appeared, yet I would not from this have it understood, that I disapprove of potting the young and tender plants, whose roots will not be so obstinate, but may be increased by proper pruning, and brought forward so as to answer for particular purposes, but not for general use.

This species of the Evergreen tribe is very patient of cutting, so that, from three or four years old, they ought to be regularly pruned and formed, which will be found no very difficult task. I formerly possessed five of the largest Evergreen Oaks in Scotland, which standing near a south wall, in about twenty years old, began to overshadow it, yet notwithstanding I would sooner have forfeited the advantage of twenty times as much walling, than hurt these trees; I made the experiment of pruning one of them, that I had on purpose suffered to grow almost in a state of nature. This experiment I executed with great severity, by cutting away all the large branches from the trunk, and several of the principal arms where the tree divided; from which I could discover no material check in its future growth, as the wounds suddenly healed.

After the plants that have been drawn from the lines, that were cut below the surface have stood three or four years in the nursery, and the untransplanted have remained as long, remove them to their proper stations for good, for from their being very hard in their root, and unwilling to push out any new fibres, any further process in the nursery will be unnecessary. Let them be plentifully watered at removal, and let that be regularly attended to once a week

week during the warm summer months, should the weather prove dry.

Though the attentive culture of this tree in such a climate as ours, must be productive of many advantages, yet I would not advise their being planted near the house or gardens, as in April and May they cast their old leaves, which occasions a prodigious litter, and in that chearful season appear ragged and gloomy.

The land they chiefly flourish in, as affirmed by several writers of consequence, is a hazelly loam. This is a species of earth few plants will disagree with, but is very far from being universal; for the Ilex will even succeed in a variety of less desirable soils: Therefore I must affirm, from experience, that such as are intended for transplanting, though they must be cultivated in a generous mould, in order to have them sufficiently rooted for the purpose, yet they will grow freely in very ordinary soils, and particularly in that which is deep, (but not wet) though very coarse and stubborn. They are indeed a little delicate at first, but soon become of the hardiest tribe; therefore may be treated with the greater freedom.

When you intend any considerable plantation of this tree, or to inclose an extent of ground with hedges, should the soil be poor or stiff, I would advise, after you have dug or trenched it well, the beginning of winter, (according to its quality) to lay some rich mould on the poor, and loose earth on the stiff surface of the border for hedges, or on the spots allotted for timber-trees, to be slightly pointed in the April before sowing.

The

The wood of the Evergreen Oak makes excellent stocks for tools, mallet-heads, axle-trees, wedges, palisadoes,——and supplies the greatest part of Spain, and the south of France, with the best and most lasting charcoal yet known.

C H A P.

CHAPTER XXXI.

THE CORK TREE.

The Cork Tree being no other than a seminal species of the Oak; for the character of its flower and seed see the Oak.

The SPECIES are:

1. The broad-leaved Evergreen CORK TREE.
2. The narrow-leaved CORK TREE, with smooth edges.

THE best English writer on this subject, has directed these plants to be propagated in all respects like the Evergreen Oak. About London indeed, which, from a variety of circumstances, is a very different climate from any other part of Great Britain, this practice may answer; but in the remote counties of England, and in Scotland, to my certain knowledge, it will not, for they make so little progress in the first summer, that the following winter forces them out of the ground, or otherwise destroys them: But in the manner I shall here direct, I have raised many trees that grew with great vigour.

Let the goodness of your acorns be made trial of, as has been directed for the common Oak, that there may be as little blanks as possible in the crop. In the beginning of March, prepare a shallow box, according to the number of plants you intend to raise; let the bottom of the boxes be pierced with holes half an inch diameter, at four or five inches asunder,

afunder, and covered with oyfter-shells or broken tyles ; put five inches deep of fine rich light mould in them, on which place your acorns about four inches afunder, and cover them with two inches more of the fame kind of mould ; place these boxes on a moderate hot-bed, of tanners bark ; and in ten or twelve days, when you find the earth beginning to dry, give it a very gentle sprinkling of water, which is to be repeated every fourth or fifth day. In a month after sowing, the plants will begin to appear, when the quantity of water must be increased, but how much, or how frequently, the condition of the earth will best direct you. In this hot-bed the box must remain until the beginning of July, then to be removed, and placed in a shady sheltered situation during the remaining summer months ; but observe, before you move them from the hot-bed, that they be gradually inured to the open air, by taking off the glasses in mild or moist weather, when the sun rays are not too strong, and late in the evenings, or all night, when the weather is temperate. On the approach of winter, with your fingers, clear the surface of the boxes of all musty particles, to be replaced with a greater proportion of finest rich mould ; when they are to be placed under frames until the succeeding spring, and are only to cover them with the glasses in violent rains or hard frosts.

From the middle of April to the beginning of May, as the weather sooner or later becomes favourable, let the boxes be moved to a well-sheltered, but shady place in the nursery, and placed on stones or logs of wood some inches above the surface of the ground, which not being attended to, is apt to occasion such a stagnation and corruption in the mould in the boxes, as frequently to destroy the

the plants, or at best to stunt them beyond recovery. During the summer months, let them be regularly refreshed with water as the season requires; and in the autumn, (though it may not often be necessary), I would chuse to place them under the protection of a frame, which may be covered in very severe winters.

In the beginning of the following April, the plants being now two years old, they must be taken out of the boxes, when, from the interruption their straight roots have met with, in not running downwards, they may be carefully undermined with a trowel, so that they may be raised with earth adhering to them. This being done without wounding the smallest fibre, put them in penny-pots filled with rich loose mould; plunge the pots into a moderate hot-bed only for six weeks or two months, till they have pushed out fresh fibres, and are in a brisk growing state. They must be gradually hardened, and then placed in the north border of the garden during the remaining part of the summer. After this these plants will require no more than common culture, and, having stood two years in the pots, may be shaken out with their whole balls of earth, and either planted where designed to stand for good, or in the nursery to remain two or three years more, for future designs, from whence they will remove with ease and safety.

Though this process, to an inactive gardener, may seem troublesome, yet it is not very expensive; and I am certain I have not directed the least superfluous labour for the reconciling them to our climate and situation.

The Cork Tree, in its native situation, is said to grow on the bleakest mountains, and poor, rocky, sterile soils, with their roots running above the surface; but these soils and situations must have some happy animating qualities belonging to them, not to be found in our northern regions, to which we must familiarize them, before we can expect to have them grow freely; if your intention is to have them of any considerable magnitude, you must give them a good solid generous soil, and a situation defended, either by nature or art, from the cold easterly and northerly winds.

The uses of cork, which is the bark of this tree, is so universally known, as to render it unnecessary to point it out. Its body being hard, lasting, and beautiful, like the Ilex, it makes excellent charcoal.

CHAPTER XXXII.

THE HOLLY TREE.

A Description of its Flower and Seed.

They have male, female, and hermaphrodite flowers on different plants. The male flowers have a small permanent empalement of one leaf, which is indented in four parts; they have but one petal, which is cut into four segments almost to the bottom; they have four awl-shaped stamina, which are shorter than the petal, and are terminated by small summits. The female flowers have their empalements and petals the same as the male, but have no stamina; in their centre is placed the roundish germin, having four obtuse stigmas sitting on it. The germin afterward becomes a roundish berry with four cells, each containing a single hard seed.

The SPECIES are:

1. The common HOLLY, with red berries.
2. The smooth shining-leaved HOLLY, with red berries.
3. The yellow-berried green HOLLY.
4. The white-berried green HOLLY.
5. The green Hedge-hog HOLLY.
6. The yellow-blotched Hedge-hog HOLLY.
7. The gold-edged Hedge-hog HOLLY.
8. The silver-edged Hedge-hog HOLLY.
9. The yellow-blotched HOLLY.
10. The white-blotched HOLLY.
11. Broderick's HOLLY.
12. Eales's HOLLY.

13. Sir Thomas Franklin's HOLLY.
14. Hertfordshire white HOLLY.
15. Bridgman's HOLLY.
16. Longstaff's best HOLLY.
17. Bradley's best HOLLY.
18. Wise's best HOLLY.
19. The British HOLLY.
20. Bagshot HOLLY.
21. Glory of the East HOLLY.
22. Glory of the West HOLLY.
23. Aslet's HOLLY.
24. The Union HOLLY.
25. Fine Phyllis HOLLY.
26. Painted Lady HOLLY.
27. Fuller's cream HOLLY.
28. Milk-maid HOLLY.
29. Capel's smoked HOLLY.
30. Partridge's HOLLY.
31. Mason's copper-coloured HOLLY.
32. Box-leaved HOLLY.
33. Whitmell's HOLLY.

HOLLY BERRIES are usually gathered soon after they are turned red, which is early in autumn; but they are by no means ripe at this season, and should at least hang on the trees until December; for, were it not for the birds, who greedily devour them, I would not advise pulling them until February or March, during which time they would improve in maturity.

The common method of raising the plants, is by sowing their berries whole, either as soon as taken from the tree, or the following spring; but of this I by no means approve.

For

For the berries containing each four seeds, the sowing them whole, (if the seeds were good) necessarily produce four plants interwoven in one cluster, and in the separating them, some of the plants may be injured.

Therefore, in order to prevent any ill consequence from this practice ; as soon as your berries are gathered, throw them into a tub of water, and rub them between your hands until they are divested of their thick glutinous covering, which will be soon executed. This being done, teem off whatever substance floats with the water, what remains spread on a cloth in a dry airy place, to be frequently rubbed between your hands, daily changing their situation, until the seed are separated and quite dry. If this is done in autumn or winter, be careful to mix the seed with sand, to be preserved from any wet or moisture until spring ; but should they not have been gathered until spring, let them be immediately sown, first disengaging the seed from the pulp and covering, which may be easily performed by a similar operation of that just directed.

The most seasonable time for sowing the seed will be in March or April, and as regular as possible, on a spot of well-prepared rich loose mould, in beds three and a half feet broad, with alleys of eighteen inches between them, to be covered to the depth of three quarters of an inch ; and as the seed will not vegetate until the succeeding spring, let the ground be kept clean, sweet and mellow, until autumn, when the surface of the beds must be loosened with a short-toothed rake, and a little fine fresh mould thrown over them, which may be raked off in the

following spring, before the seed are in any sensible motion.

In the beginning of the following April, draw out a considerable number of your Hollies, then one year old, leaving the remainder so thin that they may receive all the influences of air, sun, and rain; let the plants drawn up be placed in a shady border, of lines eighteen inches distance, and five or six in the line, giving them frequent but moderate waterings, and pointing over the ground in autumn and spring. The reason of allowing so large a space to these plants, which for two or three years will be very small, is for the greater convenience of digging between the lines, which will greatly invigorate the growth of the plants, and encourage their side-roots to spread, so as to rise with good balls of earth to each. In this situation they may remain three years.

The plants in the seed-bed, being now two years old, must be removed; and having cautiously shortened their downright, and smoothed the extremities of the spreading roots, plant and otherwise cultivate them as the former; only in this nursery they ought to continue but two years.

In a tolerable soil, and a protected situation, these Hollies may be planted out for hedges, neglecting not to cut them down to the ground, and watering them; but in poor land and in unsheltered situations, they will succeed much better, by giving them more strength from age, and culture in the nursery.

Therefore,

Therefore, to do this effectually, move your plants to another quarter of well-prepared fresh earth, and plant them in lines three feet asunder, and eighteen inches in the line. At this time let them have a plentiful watering, keeping the ground as formerly, and here let them continue untouched for two years. The third spring, uncover one side of the plants, and with a spade made very sharp, cut off all the downright roots at ten inches or a foot below the surface, and at the same time shortening all straggling roots that extend far from the sides ; then replace the earth, and dig it well about them. Having stood here another season, cut them down to the ground ; and the following, which will be the fourth year, they may be removed where you intend, without the loss of one in a thousand.

The beginning of April, having prepared the borders where you design planting your hedges, let the Hollies be carefully raised with their balls of earth about their roots, which will by this time be pretty considerable, if the culture which I have directed has been followed. The roots at this time, will require no other attention than with a sharp knife, to cut off smooth any of the fibres that have been broken or bruised with the spade in raising the plants ; let them be kept as little time as possible out of the ground, plant them at eighteen inches distance, and to the same depth they were before planted ; give them a plentiful watering, and should the weather prove dry, it must be repeated once in ten or twelve days, for three or four times. The plants being cut down the preceding year, will have made shoots from a foot to eighteen inches high ; these you are to reduce to about six or eight inches above the former year's cutting ; and thus you may

have a hedge formed, that requires no further trouble than keeping the roots of the plants clean for a few years, and annually clipping them, which, in an ordinary soil, will, in ten years, defeat the attempts of the strongest bull to penetrate it.

I have likewise planted the Holly and Thorn mixed in hedges with most desirable success, every third or fourth plant being a Holly. The Thorns, for four or five years, will advance fastest, after which the Hollies will annually gain ground, and at last totally extirpate the others, so that by planting both, you will sooner have an appearance, and afterwards, by an agreeable metamorphosis, have an entire Holly hedge.

Having mentioned the Holly only for hedges, of which it makes the strongest, warmest, most lasting and beautiful, for outward fences, of any plant this climate produces; yet I am far from intending to confine it to that purpose alone, as I know none will more adorn, or be otherwise more useful, not only in the garden and wilderness, but the more extended woods and forests. For these purposes, at the last removal directed for the hedge plants, let such a number of the tallest and cleanest shoots, as your designs require, be selected, from which cut away all but the leading shoots, and plant them in another nursery of fresh earth, in lines five feet asunder, and two and a half in the line; cultivate the ground about them by digging and dressing it, and annually prune the trees to their proper form; in which situation they may continue seven or eight years, raising part of them from time to time, as your plantation require.

The

The general neglect of cultivating this beautiful plant, both in the hedges and woods, is not a little amazing, when its many uses and good qualities are considered; and I can no otherwise account for this disregard, than from the number of miscarriages that happen by not attending to its proper culture, which would give a most assured success. Their common treatment is to remove them from the seed-bed (where they are raised generally too thick) at two, three, and sometimes four years old, and dibbling them, (still immoderately thick), where they often continued four, five, or six years, according to the demand. By this practice their roots are bad, their bodies tall and slender, and their tops heavy, so that the gentlest breeze of wind, will shake them to their foundation, from which every fibre they have pushed out is immediately destroyed, when the plants must of course perish. But by following the practice here directed, the winds make no impression on them, nor is there in nature a hardier tree, one that roots better, is more patient of cutting both in the root and body, or that may be planted with more undoubted success, from one to twelve or fifteen feet high.

The Holly tree, in a soil it affects, will grow upwards of fifty feet high, and even to a considerable size, and in as great a variety of soils as any plant I know. It refuses not the poorest, hot, sandy, gravelly, and rocky ground, nor the coldest spoutty clay and till; and its beautiful shining leaves, almost covered with rich scarlet fruit, which the severest winter does not discolour, makes it in a particular manner, at that season, a most grateful and desirable sight.

Though I have justly reported this as one of the hardiest plants, when it has been properly cultivated, and has once got a good footing, yet where hedges of it are planted on extremely poor and hungry land, particularly that which is stiff; let a small mixture of rich sandy or gravelly soil (but by no means dung) be mixed in the borders, this will much promote their early rooting, which being once put in a free-growing state, they will afterwards require no further assistance from art.

I must not here omit taking notice of a very wrong, though prevailing custom, which is, the clipping these hedges the beginning of winter. This has various ill effects, as it not only robs them of their beauty and verdure in that gloomy season, by cutting away the fresh tender shoots, and mangling the leaves, but likewise exposes the naked hearts of the plants to all the rigour of storms, dispossessed of their natural cloathing. Let this, therefore, never be performed later in the season than July, then the young shoots will have time to be matured, and give the necessary protection when the severe weather approaches.

Any description I am capable of giving in favour of the Holly hedges, will fall infinitely short of the impressions every gentleman of taste must conceive, who may have an opportunity of seeing an old fence of them, that has been properly trained. I am much concerned I cannot gratify the public with many examples of this kind; but happily there is one in Scotland, that will justify the highest encomiums of the ablest writer on that subject, which is to be seen at Tynningham, in the county of East-Lothian, the seat of the Right Honourable

nourable the Earl of Hadinton, and to a view of them I appeal, as the clearest evidence of their incomparable beauty, lasting strength, and magnificence. But how much nobler an appearance must this plant make, when standing unconstrained by the shears, detached and at freedom in the woods, loaded as they annually are with berries, (which clipping prevents), is not easily conceived. These hedges were planted by the late Earl of Hadinton, the greatest, most knowing, and most successful planter of his time, and who, to all appearance, from a very poor and unpromising soil, exposed to, and close upon the great German ocean, has raised very extensive and flourishing plantations of the most valuable Forest-trees. What I have said in regard of the hedges at Tynningham, I hope, will not be displeasing or considered as a digression from my plan; however, to keep within the line of my subject, I do most humbly recommend to the present Earl, (the proprietor) to allow some part of these hedges (which at present I think are not lofty in proportion to their thickness and strength) to run up to twenty-five or thirty feet in height; to be cut thinner and thinner as they approach the top, which in a few years would make them the most glorious sight of the kind that can be conceived, and this may be done without the least injury to the strength of the trees, but add to the beauty of their appearance, and be a most indisputable evidence of what I have asserted, in favour of this line of improvement.

The great variety of variegated Hollies for the wilderness or Evergreen garden, are likewise all highly worthy our attention, not clipped or reduced to any exact form, but, when properly
pruned,

pruned, suffered to grow in their natural luxuriance of branches and fruit. The variegation of trees in general, proceeds from some weakness or disease, which occasions their being dwarfs, and when planted in strong land, lose much of their beauty, and often turn plain : But in the Holly it is quite otherwise ; they grow to a large size, and the most generous soil does not in the least diminish the mixture of their colours, but makes them more brilliant ; so that the variations of this tree is very unlimited, and when disposed of by a good taste, affords, at all seasons of the year, a gay and pleasing appearance.

There has been many directions given, (with much solemnity and assurance of success,) for variegating Hollies from the seed, many of them I have tried, which I have found equally ineffectual with my own experiments ; from hence I can safely aver, they are all quackish impositions, and that they can only be increased by budding or grafting them on the plain green kind, in both which they will readily succeed ; but their variegation by any other means, is a sport in nature, which no art has as yet been able to imitate.

I have raised the different kinds of Hollies from layers, and even from cuttings ; But the pursuit of either the one or the other, I do not recommend, as they are not only extremely tedious in their growth, but I never was yet able to make good plants from them.

The timber of the Holly is exceeding hard, and of all strong woods the whitest : It is useful for many lasting purposes ; the mill-wright, turner,
and

and engraver, prefer it to any other ; it makes the best handles and stocks for tools, flails, bowls, bolts for doors, nay they even make hinges of it instead of iron, and it is so heavy, that, like iron, it sinks in water.

The Box tree I would likewise recommend for the wilderness, or any plantation where they may stand near each other, or be closely planted with other trees, which will make them depart from their dwarfish nature, spindle and run up, when they may be improved afterwards in bulk and thickness by clearing them of their shelter ; when woods or coppices are cutting down, they should be suffered to stand to encrease in magnitude, which they will by the time the coppice comes into growth, during this time they will not only preserve a verdure on the ground, but give a degree of vivacity to a place that otherwise would appear all desolation ; and when cut down, afford an abundant return to the planter, from the value of its wood for many purposes, which occasions an import of great quantities from Turkey, &c.

C H A P T E R X X X I I I .

T H E Y E W T R E E .

Description of its Flower and Seed.

The male flowers are produced on separate trees from the fruit of the moist part ; they have neither empalement or petals, but the gem is like a four-leaved cover ; they have a great number of stamina, which are joined at the bottom in a column longer than the gem, terminated by depressed summits, having obtuse borders and eight points, opening on each side their base, casting their farina. The female flowers are like the male, having no empalement or petals, but have an oval acute-pointed germin, but no style, crowned by any obtuse stigma. The germin afterward becomes a berry lengthened from the receptacle, globular at the top, and covered by a proper coat at bottom, open at the top, full of juice, and of a red colour ; but as it dries, wastes away, including one oblong oval seed, whose top without the berry is prominent.

The S P E C I E S are :

1. The common YEW TREE.
2. The YEW TREE, with a broader and more shining leaf.
3. The YEW TREE, with striped leaves.

TH E first and second sorts are indiscriminately propagated together : They may be raised by sowing their berries in beds three and a half feet broad, with alleys eighteen inches between

tween them, on any spot of well-prepared fresh ground. Should this be done in the beginning of winter, as soon as the berries are ripe; first divest them of the pulp in which they are inclosed, when numbers of them will appear the following spring; but as these will be in a weak state; I would advise their seed to be treated as that of the Holly, that is preserved in sand as soon as divested of its pulp, to be sown the following spring, and managed in the seed-bed for two years, and three more in the nursery, as has been directed for the Holly.

The Yew may likewise be propagated from cuttings of one or two years growth, planted the beginning of April or the end of August, in a shady border; let them be laid in lines eighteen inches asunder, covered five inches deep, and watered at planting; be careful to rub off the leaves as far as the cuttings are buried, and, in two years, they will be well rooted, and fit for removal. Branches torn from the joints, are better than plain cuttings.

The plants from seed being five, and the cuttings two years old, (though still small), remove them to another nursery, shortening their downright roots, and lay them in lines two feet asunder, and nine or ten inches in the line, to remain three years.

From thence remove them again, and plant them in lines four feet asunder, and two feet in the line, giving them a plentiful watering, which, if the weather is dry, must be repeated once a week, for three or four times; and here they may continue, if the soil is rich, four years, but if poor,
five

five or six, during this time they must be pruned, to rear them for standards, or to be clipped for the hedge, suitable to your intentions. Let the lines be carefully dug every spring, as it will much contribute, not only to encrease their growth, but multiply their roots.

If desired of a larger growth, you must once more remove them to another quarter, and plant them at eight feet distance by six, continuing the same culture as before; from hence you may remove them any time, within seven or eight years.

No plant is more patient of being transplanted when old, than the Yew; it naturally produces great quantities of small roots, to which the earth adheres so closely, that, with plentiful waterings, you may at once form complete hedges of seven or eight feet high, that will not in the least degree be retarded in their growth by removal, but have the same freshness and verdure the first season, they ever had.

There is not in nature of the hardy tribe, a tree so patient and obedient to the shears as this, or that makes so close and warm a defence against the cold piercing winds, (the Holly only excepted, which making a great deal of litter in the spring, is not so proper for the inward divisions of the garden), and therefore none so eligible for making small inclosures in the kitchen ground or nursery, to protect and forward vegetable crops, or young and delicate trees and shrubs. Of what mighty advantage such fences would be to men of fortune, if attended to, when laying out their improvements, may easily be imagined; and I must

must observe, that they are too much neglected by the nurseryman, whom they would particularly be-friend, in rearing their tender crops.

With all these advantages, I must acknowledge the Yew to be a very uncheerful plant; and the practice of planting numbers of them, cut in a variety of ridiculous figures, in the courts and fronts of houses, rendered them doubly mournful, and has no doubt increased the disregard shown them.* But for the purposes I have just recommended them, they cannot be too much encouraged; neither do I think they ought to be entirely banished the wilderness or forest, where a few of them in their natural state, interspersed with other trees, would appear with a reverend though gloomy magnificence, and would be the finest foil imaginable to the rest of the plantation, when contrasted with them, will appear with additional cheerfulness and lustre.

I have already mentioned the ill consequence of clipping Holly hedges in autumn. This ought to be yet more particularly attended to in respect of the Yew, which will be injured more by that application, than I have known them to suffer in the severest winters, as whole hedges of them become quite brown, and so weakened, that nothing but cutting them close to the trunk, would again restore them to their verdure.

This tree, when shooting in the spring, or in autumn loaded with berries, is hurtful to cattle, which, at these seasons, they should not be suffered to approach; however, the species with us, is not the true *Taxus*, or Yew of the Ancients, to which
they

they ascribed so many deadly qualities. Mr. Evelyn, in his *Silva*, mentions a tree of it growing in his time, in the Medical Garden at Pisa in Tuscany, of so baneful a nature, that the gardeners could not clip it for more than half an hour at a time, as it occasioned them to be attacked with a violent head ach. The leaves of this tree are described to be more like the Fir than our Yew, and this account of it is given by Doctor Belluceus, President of these gardens. I acknowledge the emissions of our Yew, when clipped, to be no regale, but luckily it has not the malignant effects of the Tuscan.

This tree grows to a large size, is hardy in respect of cold, and will succeed in the most barren and mountainous situations, where the greatest storms will make no impression on it. Since the use of bows has been laid aside, the wood is in less estimation than formerly; but still it brings a high price from the cabinet-maker. Posts of it set in moist ground, will continue sound for ages, and for axle-trees no wood is so strong and lasting; to which I shall only add one other very material quality, which has not yet been noticed, which is, that beds made of this wood, will not be approached by bugs. This is a truth, in the knowledge of my own practice, as I had them cut down and used for the purpose in my family.

CHAPTER XXXIV.

THE LAUREL, OR CHERRY BAY TREE.

A Description of its Flower and Seed.

The empalement of the flower is bell-shaped, of one leaf, indented in five parts at the brim, which spread open: The flower hath five large roundish petals, which spread open, and are inserted in the empalement. It hath from twenty to thirty awl-shaped stamina, which are inserted in the empalement, terminated by roundish summits, and a roundish germin supporting a slender style, crowned by an entire obtuse stigma. The germin afterward becomes a roundish fruit, inclosing an oval-pointed nut having rough furrows.

The SPECIES are:

1. The common LAUREL.
2. The white-striped LAUREL.
3. The yellow-striped LAUREL.
4. The Portugal LAUREL.

THE common Laurel is to be propagated either from seed or cuttings; but as those from seed make the most uniform stately trees, and soonest produce their fruit, so, where they are required of a large stature, I would advise their being propagated in that way, which I shall first direct.

In the beginning of winter, soon after the berries are ripe, sow them in a shady border of well-prepared fresh loose mould, in beds three and a half feet broad, with alleys of eighteen inches between them, and cover them an inch and a half, or two inches deep. In the beginning of the following March, before their vegetation begins, rake off as much of their covering as may be done without disturbing the seed, and replace it with fresh earth, to the depth of about three quarters of an inch. About the middle of April, when the seed will be in a growing state, the weather being dry, and not frosty, refresh them in the morning with frequent but gentle waterings; continue this, more or less, during the summer months, as the season shall require, changing the morning to the evening watering as soon as the danger of the frosts are over.

The succeeding spring, the ground being good, and the former summer having been favourable, as soon as their buds begin to swell, remove them from the seminary to the nursery, and lay them with the spade in lines two feet asunder, and nine or ten inches in the line, and in the same depth they formerly stood; water them at planting, and if you repeat it three or four times at the distance of ten or twelve days, the season being dry, it will much forward their growth: Let the ground between the rows be pointed over in autumn and spring, and cut away any cross lateral branches while they are in this culture, which must be no more than two years. Should the berries have been sown in poor land, the plants of course will have made but a small progress; in that case, and provided they are not too thick, they may remain in the seed-bed for two years.

To

To raise them from cuttings; about the beginning of April, or middle of August, plant them in a shady border of moist (not wet) earth, in lines two feet asunder; let the cuttings be a foot or fourteen inches long, one half of which should be buried in the ground, first rubbing off the leaves, which otherwise would look unseemly a great part of the season, and by corrupting would taint the plants. Here they are to remain until the second April, giving them the same culture as the seedlings.

With respect to cuttings of these, and all other trees, I must here take the liberty to notice a circumstance I have never yet observed to have been attended to in practice, notwithstanding it is of the highest importance in the culture of every plant raised from them; which is, the taking indiscriminately all branches of a proper age and size, without considering the manner and disposition of their growth: Though nothing is more certain, than that a clean upright shoot will produce a straight handsome plant, and that an ill-formed bushy one will continue its original likeness, and those that spread and hang over or have an horizontal inclination, will ever after continue to grow in that direction. I have planted perhaps as great a number of cuttings, and as great a variety as any man in my way; and after having first considered the order of nature, I determined to try its uniformity in a succession of experiments, so planted the three different disposed cuttings in separate lines, when, after many years growth, the distinction was as perceptible in the plants reared, as in the trees they were taken from, verifying what the poet says of education—"Just as the twig is bent, the trees inclined,"

clined," and which is not less visible in plants than in men. This leads me to observe, that gardeners for want of this attention in their choice of cuttings, ever give seedling-plants of all kinds a preference. That many plants raised from the seed have the preference of many others, is not to be disputed, but to be universally so, is what I must contend against, for cuttings that will root well and easily, are little inferior, when properly chosen. But to return to the further culture of the Laurel, I am now engaged with, every circumstance essential and favourable should be attended to, particularly as they give an advantage in time to forward whatever may be the undertaking, anticipating nature, and as it were lengthening the life of Man, by bringing forward his undertakings much earlier than they would otherwise be, was nature alone to be pursued without the assistance of art.

The seedlings and cuttings may now be treated in the same manner, and removed to another nursery, where, plant them in lines four feet asunder, and two feet distant in the line; but first shorten and cut away all ill-placed roots, and such as cross each other, carefully pruning the superfluous branches, but preserving and encouraging the principal leading shoot; take care to cultivate the ground as already directed; and annually prune them in such a manner as will most encourage them to a pyramidal form: In this nursery they may continue three years, but not to exceed four. I have as yet only directed in regard to such as are intended for tall standard trees; but such as are intended for covering of walls, forming hedges, or other like purposes, may either be so trained from the nursery, or further proceeded with, so as to answer
your

your future designs. This tree by suffering it to grow rude too long, becomes stunted and of a very irregular figure, when they are passed being recovered, or brought to a proper form, as they are much injured by cutting their old wood.

These trees from the culture they have now undergone, will be of a competent size; but if a reserve is intended for distant designs, remove them to another spot, planting them in the quincunx order, at six feet asunder, observe to attend to their former culture; where, after standing two years, they may be removed with safety at the distance of five or six years.

The two sorts with striped leaves may be increased by cuttings; but their variegation being very faint, they will soon become quite plain in a luxuriant soil, and ought therefore to be planted in a poor, hungry, dry sand or gravel. The better to blend their colours than they naturally are, render them more glaring, and of longer continuance, remove them annually, for five or six years, into poor land, budding a richly-variegated leaf on the green, or rather a variegated stock, which will much brighten their colours, and give them a greater stability than if raised from cuttings.

The Portugal Laurel will not rise to half the magnitude of the others, nor is it so easily reared into the pyramidal form, but is a beautiful and elegant plant, of a very chearful shining verdure. It may be propagated either by seed, layers, or cuttings, as directed for the other species, but, when young, are more delicate, and will be improved by a higher culture, better soil, and more sheltered

situation for four or five years, after which it will be abundantly hardy.

With the beauty of the common Laurel, we are little acquainted, as we have not grown them for any other purpose, than to have them mangled on walls and in hedges, or in clipped bushes, which, from the fulness of their leaves, are of all plants the least proper for that treatment: They will grow to the height of between forty and fifty feet, and succeed in very poor barren soils. Of all the Evergreens familiar to this climate, I have ever esteemed them amongst the most graceful: They have all the beauty of the Orange tree without its fruit; and I cannot conceive a richer appearance in nature, than a number of lofty Laurels, that have been properly trained, and planted near a house, whether in single trees, in groves, or interspersed with other Evergreens in the wilderness way.

It unites perfectly well with the common black Cherry, either by grafting or budding, which will considerably increase its magnitude, as well as render it hardy.

CHAP.

CHAPTER XXXV.

THE BAY TREE.

A Description of its Flower and Seed.

It hath male and hermaphrodite flowers on different plants, the male flowers have no empalement: They have one petal, which is cut into six segments at the top, and nine stamens which are shorter than the petal, standing by threes, terminated by slender summits. The hermaphrodite flowers have no empalement; they have one petal, which is slightly cut into six segments at the top. In the bottom is situated an oval germin, supporting a single style of the same length with the petal, crowned by an obtuse stigma, attended by six or eight stamens: There are two globular glands, standing upon very short foot-stalks, fixed to the base of the petal. The germin afterward becomes an oval berry with one cell, inclosing one seed of the same form.

The SPECIES are:

1. The common BAY TREE, with male flowers.
2. The common fruit-bearing BAY TREE.
3. The broad-leaved berry-bearing BAY TREE.
4. The gold-striped BAY TREE.

THERE are several other species of the Bay tree, but being very tender plants, and confined to the green-house during winter, are foreign to the design of this Treatise.

The three first sorts mentioned may be either propagated from seed or layers, and will make good plants in either way. Their berries are commonly ripe the end of January, or the beginning of February, when they ought to be gathered and preserved in dry sand until the beginning of March. The weather being then favourable, or as soon as it may, prepare a shady border of rich, loose, undunged soil, to be made smooth and fine with the rake, and well protected by hedges from the north and east winds; here drop the berries in lines fifteen inches asunder, and about four inches in the line, sifting over them some of the finest and richest mould, to the depth of an inch. As soon as you perceive the plants begin to heave up the earth, refresh them frequently, (but moderately) with water, in the mornings when cold, but in the evenings of mild weather, continuing this practice all the summer months; clear the ground of all musty particles in autumn and spring, as directed for other seedlings, and let them remain here two years, watering them the second summer (though more plentifully) with the same attention as the first, it being of the utmost consequence to promote the vigorous growth of this plant in its early stages, which should it then be starved for want of proper soil and culture, will become hidebound, and will hardly ever after make a straight handsome tree.

Such as you intend to increase by layers, may be laid down in March, or August, the latter of which is much the best season, as those laid down in March will be but indifferently rooted by the succeeding spring; but the others will be prepared to root vigorously early the following season,

son, and by the second spring will make strong healthy plants.

The Bay will also grow from cuttings, provided they are torn asunder at the joints, and planted in a shady border; in the open ground, their advance will be so very tedious that they will require standing four years at least before they can be removed, and notwithstanding this care, they grow thick and brushy, never making such handsome plants as either the seedlings or layers; but I have raised thousands of them in frames with the greatest advantage, by the following process: In the beginning of April, prepare a moderate hot-bed of tanners bark, and cover it eight inches deep with such soil as directed for the seedlings. In this plant the cuttings five inches deep, and eight or nine inches asunder, rubbing off all their leaves; let them have a gentle watering every evening while the bed continues warm, which may be gradually discontinued, as the warmth of the bed decreases; cover the glasses with mats during the heat of the day; when the bark has lost its strength, and the cuttings have made young shoots, let them receive all gentle showers, and the evening dews. About the beginning of August, the glasses may be taken off the frames, to be replaced again when the weather begins to be frosty, but kept open every mild day. In the beginning of the following April, or as soon after as the weather becomes temperate, remove both the glasses and frames; continue frequent and plentiful waterings during the summer months as the weather may require, and the succeeding April you will have strong well-rooted plants, fit for removal. By this process, I have raised clean-bodied Bays three feet high in two years,

years, which unassisted nature would not have effected in four.

The plants raised in these three different ways, may now all be treated in the same manner, and removed to the nursery; when, having cut away their superfluous roots and branches, attentively encouraging the leading shoot, plant them in a well-sheltered quarter of light mould, in lines three and a half feet asunder, and eighteen inches in the line: In this nursery give them all possible culture, by digging the ground in autumn and spring, and keeping it clean, loose, and mellow in summer, so as to increase their roots, and prune them annually in April to a pyramidical form. Here let them continue three years, but not to exceed four, when they may be removed to the places where they are designed to remain for good: and notwithstanding these trees may be removed at a greater age, yet I have found from experience, that this is the most proper time, in order to raise them to their greatest height.

The gold-striped Bay is of much humbler growth, and tenderer than the sorts already taken notice of. It is commonly kept in pots, and housed in winter with hardy green-house plants, tho' I have preserved it in the open ground, for many years successfully, under the protection of other hardier Evergreens; but in severe winters it has been tarnished, sometimes lost its leaves, and even the young and tender branches have been destroyed, yet the succeeding summer repaired this misfortune. It is a very strong rich variegation, and ought to be in all good collections of Evergreens. The best method of increasing this, is by budding it on any of the plain kinds.

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The Bay tree delights most in a warm, dry, sandy, or gravelly soil, where it will grow to the height of between thirty and forty feet; but to preserve its fine verdure, it should be planted in situations defended from the destructive north and east winds, to which if much exposed, it will sometimes suffer in a very severe winter, but generally recovers in summer, even after appearing quite dead. This plant should not have a branch taken from it but in the spring of the year, as unskilful, untimely, and late cutting it, has destroyed great numbers that otherwise would have defied the severest winters, many examples of which I have seen.

The shade and odour of the Bay has in all ages been esteemed salubrious to the human body; and its aromatic emissions were in the greatest reputation with the physicians of old, on account of their peculiar property of clearing the air, and resisting contagion; also, for the virtue attributed to it of resisting lightning: For we read, that the Emperor *Tiberius*, who was much afraid of it, used to creep under his bed, and shade his head with its boughs. Many other physical virtues are attributed to its leaves, berries, &c. but a relation of them is not in my province, further than to display it as a plant of elegance and beauty, and that yields a most refreshing and healthful perfume to all around it; therefore, I think it cannot be too much encouraged in our clime, where few (if any) of the large-growing plants, have these agreeable effects in so high a degree.

C H A P T E R X X X V I .

T H E *ARBUTUS*, OR STRAWBERRY TREE.*A Description of its Flower and Seed.*

The flower hath a small, obtuse, permanent empalement, which is cut into five parts, upon which the germin sits. The flower is of one leaf, shaped like a pitcher, and divided into five parts at the brim, which turn backward. It hath ten short stamina, which are joined at the bottom to the flower leaf; these are crowned with bifid summits. At the bottom of the flower is situated the globular germin, supporting a cylindrical style, crowned by a thick blunt stigma. After the flower is past, the germin becomes an oval or round berry, having five cells, which are filled with hard seeds.

The S P E C I E S are :

1. The common STRAWBERRY TREE, with round fruit.
2. The STRAWBERRY TREE, with longer flowers and egg-shaped fruit.
3. The smooth-leaved STRAWBERRY TREE.
4. The cut-leaved STRAWBERRY TREE.
5. The red-flowering STRAWBERRY TREE.
6. The STRAWBERRY TREE, with a double flower.

TH E five sorts first mentioned, are to be propagated either by seed or layers. The method by seed I shall first direct. Their seeds are commonly

commonly ripe from the middle of November until the end of December, as the summer and autumn have been more or less favourable : But one caution is necessary to be attended to, which is not to gather fruit indiscriminately, but only such as have fully ripened. The ripe berries are easily discovered from the unripe, by their rich scarlet colour, or deep brown tawny hue : Therefore, as soon as you discover them in this state, examine your trees every two or three days, that the ripe fruits may be collected. The berries retain their growing quality but a very short time ; and the usual practice is to separate the seeds from the pulp, as soon as the berry is taken from the tree : But the contrary I would advise, and this from experimental knowledge ; for having in my possession a number of these trees in high perfection, and which annually fruited ; my method was to preserve the berry entire in dry sand, until the season for sowing the seed, which was then readily obtained, by rubbing the berries between the hands, when the seed will readily separate from the pulp, and may be sown though mixed with the sand.

About the middle of March, prepare a moderate hot-bed of tanners bark ; and if the quantity you intend to raise be large, lay on six inches deep of the finest rich loose mould, and sow the seed on it, covering them not more than to the depth of the sixth part of an inch ; but if your quantity is small, you may sow them in pots, and plunge them up to the rim in the tan. In five or six weeks the plants will begin to appear above ground, when they must be frequently but very lightly sprinkled with water, from a small watering-pot with a fine rose ; for, being then very tender, if the water is
carelessly

carelessly dashed upon them, many will be destroyed. Let the bed be shaded with mats during the heat of the day; and when the plants have been a month above ground, they may receive the evening dews, and gentle showers, more and more as they advance in strength, until about the beginning of August, when, having been well managed, the glasses ought to be taken off, that the plants may enjoy all the heavenly influence of the vegetative powers in mild weather; but as soon as winter approaches, it will be necessary to have the glasses at hand, to be replaced in severe weather, but attentively admitting the open air to them when otherwise.

About the beginning of April, in the succeeding spring, prepare another hot-bed, which need only to be arched over with hoops, and covered with mats; raise the seedlings (which, if regular care has been taken, ought to be six or seven inches high) with a trowel, with all the earth that can be preserved to their roots, and put them into penny-pots, filled with such a soil as they were in before; plunge the pots to their rims into the hot-bed immediately on removal; water them, and continue constantly to do so gently as you see the surface becomes dry, in which state they are to remain until the beginning of August; to be gradually hardened, by exposing them to the open air in the preceding month in calm moist weather. At this time take them out of the bark, and place them in any warm spot, under the protection of hedges, until October, when they may be exposed to the winter sun in any situation most convenient, where a mat can be thrown over them during a severe storm. The following spring, take all the mould (now exhausted) from the surface, till you approach the

the roots, and fill the pots again with rich earth; remove them to a shady border until autumn, watering them in dry weather every second or at most third evening, and then expose them again under a wall or hedge to the winter sun.

Having now stood two seasons in the pots, let them be shaken cautiously out with all their balls of earth, which may be easily done, as by this time they will be well rooted; pick away as much earth as you can from the outer part of the ball, without breaking or disturbing the roots, and cut off with a very sharp knife such parts as may from confinement be mouldy or musty; plunge them in a pail of water and earth for an hour, and then place them in two-penny pots, where they may continue two or three years, as your occasions may require; but keep them the first season under a shade and in shelter, and water them regularly and plentifully in dry weather, after which they will require no extraordinary protection, or further trouble, than watering, with other potted plants, as the season requires; only observe, every spring, to take away all the earth that will come from the surface of the pots, and replace it with that which is fresh and rich.

These plants being now strong and hardy, may be removed to the places of their abode for good, which ought to be either by nature or art, a generous dry soil, and under the covert of other trees, but at a proper distance; for though I never knew any strong plants of the *Arbutus* killed in a good soil and situation, except early in life, in the year 1740, yet, as I should not choose running the smallest risque of losing whole plantations of so lovely a tree, and waiting ten or twelve years to see it again

again in any degree of perfection, I would warmly advise, that every nurseryman, at least such who have the advantage of protection, to keep a large store of well-grown plants, from three to six or eight feet high, in pots; least some fatal storm should again rob them of those in the open ground, as they would in some measure repair that misfortune.

The reason for directing these plants to be kept so long in pots, is, that their roots are naturally loose and straggling, with very few fibres, on which account great numbers of them constantly fail when removed to the open ground; but being contracted in their bounds, and assisted by the heat of the bark, their dispositions are changed, and they produce roots and fibres in great abundance, which encourages their future plantation.

It must also be observed, that this tree is not fond of being much pruned at removal, which must therefore be performed either a year before or after that operation.

The sort with double flowers is more dwarfish and tender than the other kinds: It does not readily succeed either by budding or common grafting, but may be propagated by inarching on any of the other sorts, which ought to be a free-growing healthful stock, otherwise they will not unite well, or be long-lived.

The *Arbutus* is certainly amongst the most elegant and beautiful plants our country produces in a vigorous state; to a person fond of Gardening, and who passes the winter in the country, I cannot think any tree more worthy a careful culture
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in so cold and inhospitable a climate as Great-Britain sometimes is in the winter months. To come in from the open fields, or even from a plantation of other trees, to a grove of these (protected from storms), their leaves shining with the most cheerful verdure, their blossoms smiling as in spring, and their boughs loaded with the richest scarlet-coloured fruit, must inspire any one capable of being affected by the beauties of nature, with the most lively and agreeable ideas.

These trees will not succeed in a moist, heavy clay land; they will grow tolerably well in a thin and sandy soil, though not rich, but they most affect that which is deep, loamy, and generous. They will rise with us to above thirty feet high, in a favourable situation, sheltered at some distance by other trees.

C H A P T E R X X X V I I .

T H O R N S .

Their CULTURE from the SEED, till they arrive to the size of becoming Fencible Hedges at transplanting.

A Description of its Flower and Seed.

The empalement of the flower is permanent, of one leaf, cut into five spreading concave segments. The flower is composed of five roundish concave petals, which are inserted in the empalement. The number of stamina are different in the several species, from ten to twelve or more; these are also inserted in the empalements, and are terminated by single summits. The germin is situated under the flower, and supports an uncertain number of styles from three to five, which are crowned by beaded stigmas. The germin afterward becomes a roundish or oval berry, carrying the empalement on its top, and inclosing four or five hard seeds.

The S P E C I E S are :

1. The common HAWTHORN.
2. The double flowering HAWTHORN.
3. The Glastenbury THORN.
4. The Cockspur, or Virginian HAWTHORN.
5. The Virginian HAWTHORN, with long strong thorns.
6. The Virginian HAWTHORN, with a plum leaf, and black fruit.
7. The common HAWTHORN, with white fruit.
8. The

FOREST - TREES. 243

8. The American HAWTHORN, with yellow egg-shaped fruit.
9. The American HAWTHORN, with yellow round fruit.
10. The Maple-leaved HAWTHORN.
11. The Pyracantha-leaved THORN.
12. The Cockspur HAW without THORNS.
13. The narrow-leaved HAWTHORN.
14. The Gooseberry-leaved THORN, with yellow fruit.
15. The common Nottingham MEDLAR.
16. The large Dutch MEDLAR.
17. The Neapolitan MEDLAR.
18. The Virginian MEDLAR, with shining leaves.
19. The Dwarf MEDLAR, with red fruit.
20. The Dwarf MEDLAR, with black fruit.
21. The large red Virginian AZEROLE.
22. The AZEROLE with yellow fruit.
23. The PYRACANTHA, or EVERGREEN THORN.

THE usual method of propagating the common white Thorn, with which I shall begin, is so universally known, as to render it unnecessary to be related here ; and the more so, as it is very faulty, and will admit of as many improvements. The plants, from the seed-bed, are usually sold at so low a rate, that the more skilful nurserymen cannot afford what they raise at double the price. Upon this account they are generally sown extravagantly thick in order to make some profit of them, and not any thing more common than to hear nurserymen exulting in their knowledge and success, by having more plants on the same quantity of ground than their neighbours, unmindful that they are boasting to their shame, as the plants are of little value, and

that an experienced and judicious planter would not accept of them as a present, knowing them unworthy his attention. But as the noblest and most useful improvements in agriculture, in a great measure, depend on the best methods of cultivating this common hardy plant, I shall treat it with more distinction, and order for its food much better fare than has been usually given it. The practice I shall here direct, will not perhaps suit the nurseryman I have been just speaking of, but such as are of liberal principles, may be encouraged to pursue it, as well as the private gentleman, engaged in the improvement of his estate, or domaine; which they will no sooner do, than they will discover its value in raising the stoutest, hardiest, and most lasting Thorn hedges.

The berries, which are most commonly gathered too soon, should remain on the trees until the end of October, when they will be of a blackish colour, and their flesh in a decaying state. They are usually kept in sacks after gathering, and buried in heaps on the gardener's receiving them: But this is exceedingly wrong, as it occasions a fermentation, which effects the seed, owing to their outer coat heating by putrefaction, this deprives many of the kernels of their vegetative power, and has occasioned the loss of numbers of crops, without the owners being able to assign any cause. Let your Haws as soon as gathered, be spread on an airy floor for five or six weeks, until the seed are become dry and firm, when they are to be cast into tubs of water, and entirely divested of their pulp, by rubbing them between the hands with a little sand; which as soon as done, spread them again on the loft for three or four days, until quite dry, and mix them thoroughly with some
fine

fine loose sandy mould, in quantity not less than the bulk of the seed, and lay them in an heap against a south wall, covering them over three or four inches deep, with soil of the same quality, as that with which they are mixed ; and in this situation let them continue until the second spring, as the seed, though sown, will not appear the first year.

In order that the berries may be equally mixed with the soil, it will be necessary to turn over the heaps once in two months, blending the covering in the winter months. It is owing to the neglect of not mixing the seeds properly, and divesting them of their pulp, that we so seldom see more than one half of the seed appear the season of sowing, but continue in the ground another year ; and then, if the former year's plants are not taken up, which is seldom done, the remainder, by coming up under their shade, are starved, and good for little. But I shall now proceed to lay before you such a practice (having attended to what has been already directed) as will prevent these unlucky circumstances.

The berries of the Thorn begin to vegetate with the earliest plants, and, in the natural season of their growth, will spring if kept in any considerable quantity together, without the mixture of the sand or light earth ; hence it becomes indispensibly necessary, to be prepared to sow them, the first dry weather in February. The season being come, separate the berries from the loose soil or sand with which they were mixed, with a wire sieve, in order that you may sow the seed in an equal manner. The ground ought to be of a good natural quality, dry, and not lately acquainted with dung, which, unrotted, has very malignant effects on many plants, and on none more than the Thorn ; the soil being

good fresh land and well prepared, divide it into beds three and a half feet broad, with alleys of eighteen inches between them; take off a little of the surface of the beds to be laid in the alleys, as is practised for small kitchen-garden seeds; sow the seed with great care, so that they may not rise in clusters, and that the plants, may not be nearer than an inch to each other; let the seed be well pressed into the earth with the back of a spade, drawing over them the soil you had laid in the alleys, with such an addition as will cover the seed to the depth of half an inch; for no plant is more delicate, when rising, than the Thorn, or more readily smothered by too deep a covering.

Thus managed, the Thorns will all appear the season of sowing, which according to the old practice, will be making a saving of one half of the berries, and procuring an equal crop of strong plants.

The succeeding spring, draw out all the largest plants where too thick; shorten their roots, cut off so much of their tops as to leave them about two inches above ground when planted, and lay them (but beware of dibbling) in lines a foot asunder, and four inches distant in the line, to remain two years.

Such as would choose to follow the old practice, I must persuade to sow the Haws much thinner; sensible that I shall not be able to prevail on many gardeners at once, to relinquish the prejudice that custom has confirmed, yet some I have the happiness to know of more liberal sentiments, and who want no more than a reasonable hint, to try any experiment that may tend to promote by a better culture, the growth of our hedges and Forest-trees:

To

To these therefore, and to such as are not straitened in ground, I, from the most substantial reasons, advise the following practice :

Let the berries be sown thin, or rather drop them into drills, made either with your fingers, or with a very small hoe, at eight inches distance the two first drills, and double that distance between them and every following two, being careful they are no deeper covered, than directed when sown in beds ; let the ground be kept very clean and mellow about them, till the succeeding spring, when you must draw up such as are too thick, as formerly directed ; after this, cut the remainder with a spade, about five or six inches below the surface, to remain another year, first pointing over the ground between the lines.

That this practice is no vague opinion, but much preferable to crowding them in beds, carries the clearest evidence, to every man of the least attention, who does not choose to shut his eyes, and who will be at the pains to examine the plants on the edges of beds next the alleys, where he will universally find them of double the size, and more abundant in roots, than in the middle of the beds.

Notwithstanding the preceding directions, both for preparing and sowing the berries, are the best I know of to procure strong well-grown plants, yet, when numbers only are the object, without any regard to the time saved, or their future quality ; I am sensible greater numbers may be procured with less trouble and expence, by sowing the seed immediately as soon as ripe, or the following spring, which is the best season, as, then the surface of the ground will be but one winter battered with the

storms, instead of two. The seed which is not to appear until the second season, is to be covered to double the depth of the seed that is to appear the first season. In autumn, rake from the beds all mossy corrupted particles; and, in the following spring, before the vegetation is brisk, reduce the covering with a short-toothed rake to half an inch. By this attention, all the sound seed will come up at the same season; but the plants will not be one-fourth-part of the size, or have near so good roots as those whose berries have been preserved as directed, and sown on fresh loose soil, for their appearing the following season. From the small size of these plants, it will be necessary they should remain in the seed-bed two years.

Thorns may also be propagated to much advantage, and two years time saved, by cuttings from their roots. For this purpose, at removing a nursery of them, cut off all unnecessary roots that are straight and clean, of one, but not more than two years growth; let them not exceed the length of four or five inches, and, either early in October, or February, lay them in drills cut out with the spade, with their tops a quarter of an inch below the surface; let these drills be a foot asunder, and the roots in them at the distance of three or four inches, as not a single fresh and sound root will fail, that has been planted with care and attention. If the land has been well prepared, of a good quality, and kept clean and mellow, the plants will be from eight inches to a foot high the first season; and the following spring, having pointed over the ground between the lines, they must be cut with the hedge shears, to within two or three inches of the surface, when, by continuing a proper culture during the ensuing summer months, they will in general be
eighteen

eighteen inches high, and most abundantly rooted at two years old.

I am very far from intending to divert any one's attention from following the justly established principles, of raising plants in general from their seed, fully sensible of its preference to all other practices in most cases ; but as there are few rules without some exceptions, this appears to me one ; in which the saving of time is not a little advantageous : To which I shall add, that these plants, in place of one strong perpendicular shoot, (which is commonly the case of young vigorous seedlings), push out a number of shoots very much equal in strength, and continue to grow in that manner, not suffering a few branches to run away with the sap which ought to nourish many, and that too in much the same proportion ; hence, from experience, I must affirm, that for the most equal, close, and impenetrable hedges, plants raised from young and tender roots are the best ; but for single trees, meant to grow in the most comely form, and aspire to the greatest height, those propagated from seed are to be preferred.

All the different plants are now to be treated in the same manner, and in October should be planted out in lines, at least eighteen inches asunder, and six inches in the line, their roots having been shortened, and their tops cut down, so as to stand four or five inches above the surface when planted. In this nursery they should remain no longer than two years, and the ground must be dug both in autumn and spring between the lines, as it will occasion their rooting abundantly, as well as promote vigorous clean shoots, that, the year after when
planted

planted in this nursery, may again cut down to an inch or two above the former cutting.

In autumn, remove them to another quarter, and plant them in lines four feet asunder and two feet distant in the line : Let them now be cut to the height of a foot or fourteen inches, and, about the end of June, clip them straight in the sides and thin in the tops. Having stood here a year longer, cut them again to the height of two, or two and a half feet, as, from a favourable or bad season, their shoots have been more or less vigorous, clipping them as you did before. The ground being of a good quality, and properly cultivated, in the third season, they will admit of being cut at three and a half feet high about mid-summer, and raised the following autumn, when they will make handsome hedges about four feet high, that will at once afford both pleasure and shelter.

But to bring them to the highest degree of perfection, let them be once more removed with balls of earth, which they will naturally have, if carefully and skilfully raised. For this purpose, let a trench on each side be dug up considerably deeper than the spreading roots, then with a sharp hedge-bill or knife, cut across all the downright shoots, which, from the former transplantations and proper dressings, will not be many or strong ; at the same time keeping them as steady as possible, to preserve the balls of earth to their roots. This being done, lay them gently down on one side, and with a sharp knife smooth the extremities of their roots, equally shortening those that are downright or too spreading ; having previously prepared upright trenches to receive them at eight, or where
land

land can be spared, ten feet asunder; in these trenches let them be placed the same depth they formerly stood, and at four feet distance in the line, giving them an abundant watering; cultivate the ground about them, which may be cropped with various kitchen herbs, and here let them remain three years, clipping, and in all shapes dressing them to their proper form, as if planted out for good.

Early in October, while the ground is warm, begin planting your hedges. To effect this properly, make a trench as formerly, but both wider and deeper than to contain the roots; for should the ground be poor and thin, it will be necessary to lay a stratum of middling fresh earth at the bottom of the trench, six or eight inches deep, or, where your situation will admit, a greater abundance will be the better; and having levelled the trench to a depth suitable to receive the plants, let the earth settle for some days, that it may not afterwards subside in any material degree. In the mean time, before you raise the hedges you intend to remove, go over them with a light sharp hedge-bill, and cut out all such branches, (particularly towards the top,) as are too thick and stand too near each other; cut them to your intended height, not exceeding six feet high; then raise, and plant them as directed for the former removal, at such distances as they may join close together; let them have a plentiful watering at planting, and repeat it three or four times during a dry spring and the summer months, when, after being established one year, they will resist the rudest attempts of the wildest animals in this country.

The

The wind is the great enemy of new-planted Thorn-hedges of any considerable size; but, by the judicious performance of what has been directed, from which the roots will be so encreased as fully to balance the heads, so that the trees will be enabled to withstand the winter storms. Every gardener of common understanding, in order to save several years growth, very judiciously enquires after old hedges, (I mean such as are not, from age or other circumstances, in a decaying state), in order to cut them down preparative to their being moved to a situation he desires. I need not mention, that such grow more in one year, than a young Thorn in three or four; and if they grow freely without any preceding culture, when cut down, and removed at the same time, (which by the bye must be no small violence done them at an advanced age) I am at a loss to discover what reasonable objection can be offered against the process I have just directed, as the plants by it are cultivated in such a manner, as to give them ten times the number of roots they possibly can have in their wild state, and brought to such a proportion of body as their roots will keep sufficiently steady; I say, when these circumstances are considered, what doubt can arise, but that Thorn-hedges immediately sensible will succeed? Strange, that in a country which boasts of abounding with the best gardeners in Europe, such simple essays as these should not be frequently made for the benefit of such as are willing to bestow a little more than common expence, and choose (if I may be allowed the expression) to anticipate time, and accelerate an improvement that the possessor has a right to attempt, both from his fortune and spirit of improvement.

I cannot

I cannot quit this subject, without pointing out an error almost universally practised in clipping our hedges thick, and broader at top than bottom. This has rendered of little benefit the greatest part of the fences within my knowledge, which properly trained, would have been the highest ornament, and most solid improvement our fields are capable of receiving. How a practice so glaringly opposite to nature, and even to common sense, should be adopted in a country devoted both to the study and practice of planting, is strange to imagine! but unluckily it requires no proof, for such is the case. The under parts of the hedges so trained, are quite deprived of the benefit of the rains and dews, these indispensable supports of their strength and verdure, and are in some degree smothered, which occasions the weakest branches annually to perish, by this the bottom becomes quite naked, which no future care or industry can repair, but by cutting them down, or at least reducing their height, and pruning them close to their naked trunks. This, tho' a certain, is yet a tedious cure; and to expose the fields to their original cold and defenceless state, after bestowing on the hedges a care, which if it had been properly applied, would have made them continue beautiful and fencible for ages: Therefore to avoid this danger, let your hedges be gradually clipped taper from the bottom, in form of a razor, until they arrive to their intended height; this can be easily executed by a man with spring shears, to the height of fifteen feet, without any apparatus to raise him from the ground. It has been a matter disputed whether it be necessary to continue to clip hedges when they are old, where ornament is not the immediate object, and that the hedges are only boundaries

daries or divisions of corn or grass lands. However this cannot be disputed, that wherever warmth is necessary for the protection of land or crops, it cannot be more easily or certainly proved, than by exercising the shears, which must be left to every one to judge how far the expence may suit his convenience, which perhaps may not be so great as imagined, when properly put into execution and pursued. The Thorn tree, when not under any discipline, grows in a loose ragged manner, with heavy and spreading tops, which destroy many of the under branches, for want of air and moisture, and when planted in loose or wet lands, the winter winds displace and disfigure them extremely; so that, when all circumstances considered, I could never discover any well-founded argument against clipping them, save the expence, which, if annually done after a proper manner, in the months of July and August, will be small in proportion to the pleasure and benefit that will follow from it.

Digging and keeping clean the borders on each side of your hedges, at least for a few years, will also be well-bestowed labour, as it will much accelerate their growth, and contribute to their speedily thickening at bottom.

Many improvements may be added to the common practice, in the disposition and manner of planting our young Thorn hedges. Some lands indeed are so thin and meagre as not to produce tolerable fences without a greater depth of soil, but hardly any are so bad (very wet grounds excepted) as will not nourish Thorns in such a degree as to become fencible, by an addition of soil (though of the same quality)

quality,) when previously well blended together, and exposed to the summer's sun and winter's frost, for a season.

Therefore, in order to inclose the ground of a dry thin soil, mark out the distance of four feet for the breadth of the ditch at the surface, then raise the fods sixteen inches square, and lay them with the grass side downwards, at eight inches distance from the edge of the gripe, one row of fods made three deep employs the surface taken up, then you are to lay a line of Sweet Briars three or four years old, (that have been transplanted,) from a foot to eighteen inches asunder, to be covered with the best earth, laying the remainder of what is good, immediately beyond their roots. For the finishing of your bank, you must procure fods from the adjacent ground, as it is to be raised eighteen inches higher, then lay another line of Sweet Briars, placing them so that every plant may fall over the distance kept in the former line of plants. These being also covered as the first line, you are now to dig the gripe of your ditch to the depth of four feet, and as wide at bottom as to admit a man readily to heave the soil over the bank: Proceed then to complete the bank, (which, for an immediate outward fence, must be four feet high,) laying the last row of fods with the grass side uppermost, as it will soonest make them unite, and form one consolidated surface; the solids are not to batter more than six or eight inches from the base to the top. The common practice is to make the banks slope in the same proportion as the sides of the ditches; and the argument for it is, that they stand the weather better. But if the fods are carefully laid, and well pressed together with the
back

back of a spade, there is not the smallest danger of their failing at the height I have directed them to be made, and therefore I would advise them to be laid within six or eight inches of being perpendicular: My reason for this is, that I intend the Sweet Briars planted in the face of the bank shall hang over the side of the ditch under it, to protect it from being washed down by violent rains. It will also be a better defence against cattle, who are often invited to make trespasses from the easy assent offered them by otherwise making the banks; but from this position they have no footing, and when the Sweet Briars have stood two years, cattle in the gripe of the ditch will not be able to raise their heads without being opposed by them, which they will not attempt a second time. A sheep-park thus inclosed, will, in three or four years, confine these animals no less effectually than the highest wall, as they, and indeed horses as well as cows, cannot bear the touch of them. Persons even in ordinary circumstances, can think much of the expence of the Sweet Briars, as there is not any plant more easily or expeditiously raised; or may be had at a cheaper rate. In order to propagate them by seed, let hips be gathered in autumn, to be kept in sand during the winter; and in spring rub out the seed to be sown in drills upon low banks; they shoot to such a considerable height, that in two years they become a very considerable fence, and will even keep out sheep. This Briar abounds with so great a number of penetrating roots and fibres, as soon to render any bank they are placed on as impenetrable as a wall; and there is no plant yet discovered, so proper for filling up the gaps of old hedges of all kinds, or where plants of the same sort of the hedges will not succeed. But I shall
now

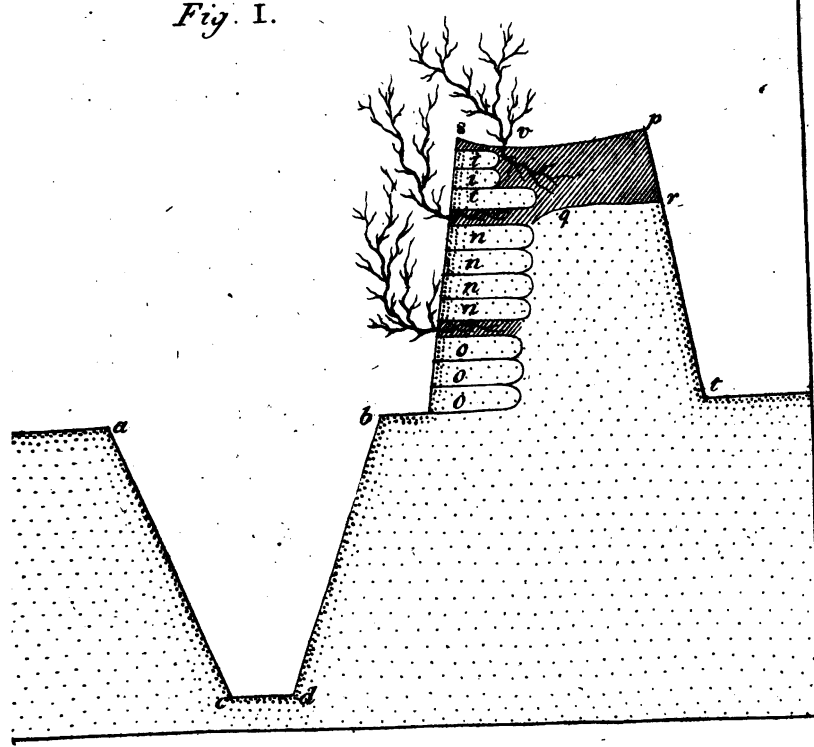
now proceed to the constructing the inner side of the bank.

Having furnished this with the best earth you can procure, slope it gradually to the height of three feet from the base, so that the rains may not wash it down, and as the bank is to be four feet high, the additional foot is to be made good with the best soil you can procure, as in it the thorns are to be planted, which is to be finished in a hollow surface of two feet, the better to retain the moisture to feed the new planted Thorns. On this plant your Thorns, and in nearness proportioned to the size of the plants; for the common run of Thorns of three or four years old, six inches distance is the general rule, but for stout plants that have been twice removed, and consequently have abundance of roots, a foot will not be more than a sufficient distance. These Thorns must not be planted upright, but in such an horizontal line, that the top of one may extend as far, and be just over the root of the other; and this in the length of the bank from end to end, the plants inclining one over the other. This method of planting, will make them bush from the bottom like a fan, and in two years, by keeping them as has been directed, they will be so close that a small bird cannot get through them.

*The EXPLANATION of the PLATE.***FIG. I.** *A transverse section of the ditch and gripe.*

- a. b. c. d. Section of the gripe, four feet at top from a. to b. and of the same depth.
- c. d. The width of the bottom of the gripe, which must be sufficient to admit a man to stand in, to heave the earth over the bank.
- b. c. A space of eight inches between the edge of the gripe, and the foundation of the bank.
- o. o. o. Three rows of fods dug from the surface of the gripe, laid with their grafs side downward; the shaded part immediately over them, represents the good foil for the Sweet Briars to grow in.
- n. n. n. n. The second rows of fods, sufficient to raise the face of the bank eighteen inches higher; the shaded part is the good foil for the second row of Sweet Briars, over which are more fods (marked i.) so as to raise the face of the bank (e. s.) four feet, which must batter or fall in eight inches.
- s. p. The top of the bank a little hollowed, so as to retain the moisture, and of such a breadth, as to leave the space (v. p.) between

Fig. I.



Scale of Feet.

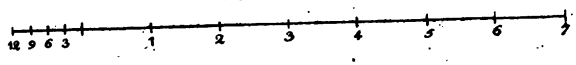
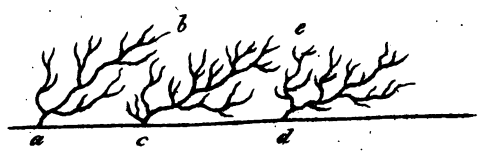
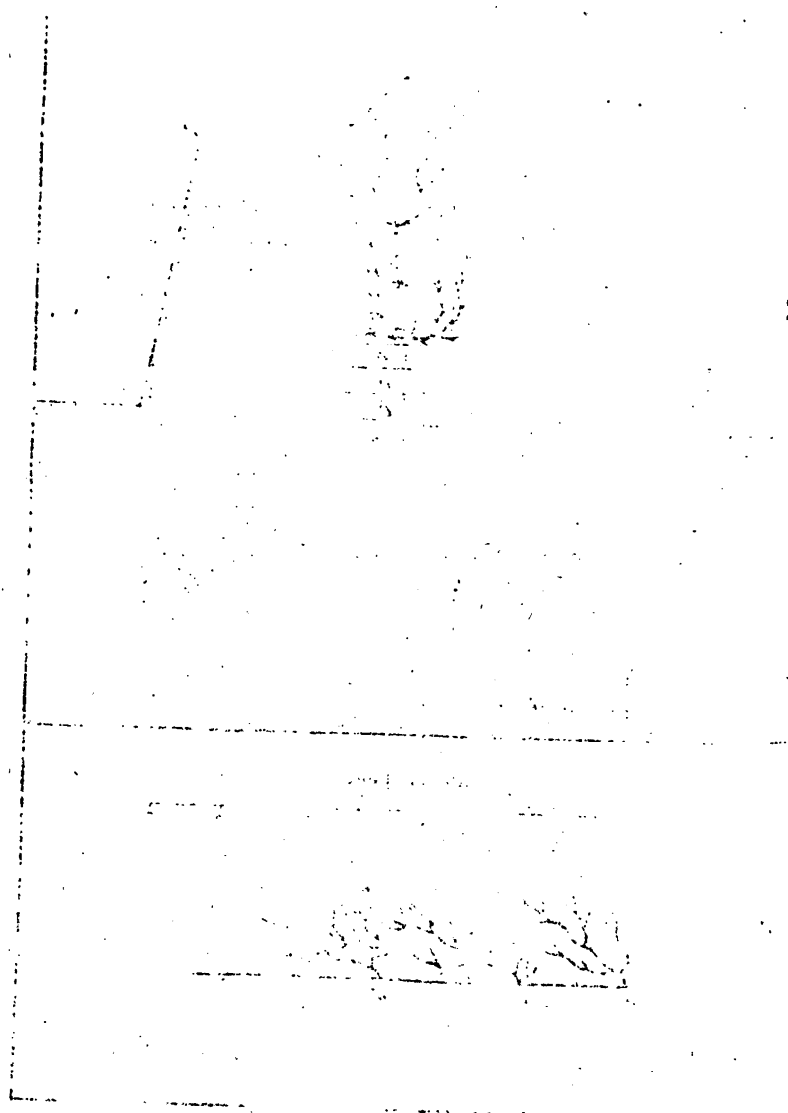


Fig. II:





tween the row of Thorns (planted on the top) and the inner edge one foot and an half.

- s. p. r. q. A foot deep of good foil, in which these Thorns are planted.
- p. t. The inner face of the bank which is to batter, so as to leave the base four feet, and the top two.
- e. t. The base of the bank which must be four feet in breadth, made up of the earth dug out of the gripe with part of the fods.
- r. t. The height of the bank measuring four feet, made up of the earth taken from the gripe, with a foot of good foil for planting the quicks at top.

A longitudinal Representation of the Quicks on the Top of the Ditch.

FIG. II. The quicks are to be planted on the top of the bank, in the manner represented, (Fig. II.) the top of each plant being directly over the root of that immediately before it. The distances (a. c. d.) between the plants, are to be proportioned according to their age; viz. For plants of three or four years old six inches; but for those that have been twice removed for the better growing of the plants, a foot is sufficient.

The different sizes of Thorns, to procure fenceable hedges sooner or later, has already been mentioned; and it must be left to every improver's judgment, what money or labour he chuses to bestow: Therefore I shall only add, that an old Thorn is hardier than a young one, and will succeed in coarse obstinate grounds, where the other will perish; the difference of expence between those of three and six years old is nothing, for allowing the oldest to be double the price, they will plant double the space. In unkindly soils, what I have here said, I know experimentally to answer; but it may be observed, that small Thorns planted in a good soil, at the same distance they ought to stand when older, will in time make equally good hedges. This I must grant; but the difference of expence can bear no proportion, to the advantage of having a good fence three or four years sooner, and saving in that time the expence of culture, which for small plants is much greater than when large; so that I cannot think any circumstance should prevail with the gentleman of ability, to make choice of any but the well grown plants for his work.

The same rules directed for training Thorns in the nursery, intended to form immediately fenceable hedges, are to be observed in respect to such plants, as are designed for improvements or the field.

It may be necessary here, to offer some reasons for my making choice of Sweet Briar, for the face of the ditch in preference to Thorns, which are usually made use of. The best I can offer, is, the hardness of the plant, which will succeed in many soils and situations where Thorns will not; and
what

what is more material in the present case, is, that being a dwarfish light shrub, they never arrive to such a size or weight, as to be affected by the winds in any degree, that will in the least loosen or shake the banks, which is too frequently the case with Thorns.

Of all the devices yet fallen on for planting hedges, none are so natural, and effectual for the inward divisions of dry ground, as that of raising them on the surface of a well-dug, or trenched border, thickened where the soil is thin, or mellowed by labour and warm loose earth, where cold and stiff. Next to that, both in point of beauty and utility, is on the top of a sunk fence built with stone; but even there, though for several years they will grow about as fast as on a level, yet, when the roots approach the wall, they are of consequence retarded in their progress on that side, and will not afterwards grow with the same luxuriance as on the surface unconfined on both sides.

In wet lands, not only ditches, but these double and deeper than what have been directed, are indispensibly necessary, as the first capital improvement that can be made, which ought to be so disposed as to receive small covered drains from the wet quarters of the adjacent fields, at the nearest distances may be, to convey the whole water away; and which, in many situations, may save a great expence, by shortening the unnecessary distances of these drains.

To attempt general systems for the draining of grounds is quite useless and ineffectual, as it de-

pende too much on local circumstances. The different kinds of drains for different soils, accommodated to the materials those soils produce, or that are convenient to be had, may be directed; but no language can convey such rules as will instruct the unexperienced in the knowledge of an universal system, as the same plan will rarely answer any two fields of an hundred, therefore, without getting a particular plan of every spot, we get nothing, a general useful one being impracticable. Nature must dictate the courses we are to follow, good sense pursue those dictates, and experience conduct the different manners of operation.

Where double ditches are determined on, their breadth must be proportioned to whatever plantation you intend them for; but in general they are made too narrow, which occasions them to become too dry, when of course the plants are not properly nourished. For a hedge only, the bank ought to be nine feet at bottom, and eight at top; for a hedge and one line of trees, sixteen; that is, planting the trees at eight feet from the hedge, and four from the edge of the bank; and for two lines of trees, one on each side of the hedge, twenty-eight feet. This I think is the least distance that can be given; but where stripes of land are wanted, either for wood, or the improvement of the climate by shelter, the plantation ought to be broader or narrower, as the inclosures they are to surround are greater or less.

Let the quality of the soil be considered in the construction of ditches, and more bafe given to the
the

the perpendicular height, where the land is loose and sandy, or spongy and mossy, than where well tempered and solid, or obstinate clay and till. A ditch, on soils of the latter quality, four feet wide, will admit of being of the same depth; of the former, three feet depth to the same breadth, will be in general as much as it will bear, and so in proportion as the ditches are broader or narrower. In spongy and mossy soils the Sweet Briars will be doubly useful, as they will there succeed better than most other plants, and consolidate the banks sooner and more effectually.

The fences in Windsor Forest, for confining the deer, and preventing their depredations in the adjoining fields and plantations, are held by many improvers as the best model for fences in general. But I am sorry I cannot fall in with their sentiments; their nature and construction I am well acquainted with, having lived a considerable time in that neighbourhood: They are made of double ditches, the contents of which form a bank between them; on the top of this bank, is planted a hedge-row either of white Thorn, or Crab, Maple, Hazel, Elder, Elm, or Oak trees; a little above the ditches, a dead hedge is erected, by driving stakes into the ground, to be interwoven with black and white Thorns, Brambles, Briars, or whatever brush-wood can be most conveniently procured, to protect the plants till they become sensible. That these kinds of bulwarks may frighten deer, or even lions, &c. from approaching them, I cannot doubt, as they present a most unnatural, gloomy, and horrid aspect, and which, in my opinion, highly deforms a spot, otherwise abounding with the sweetest,

est, richest, and most magnificent objects I ever beheld. One great argument used in defence of these fences, is, the profitable returns they yield for fuel, in a country where they have no coal nearer than London ; but I should think very little ingenuity might contrive to raise more and better fuel on the same quantity of ground : In short, I cannot think them calculated for any thing, but a savage uncultivated country, where there is danger of being invaded by wild beasts, whose incursions they might probably repel.

Where hedges of uncommon strength are required, I know nothing so effectual as double lines, planted in the triangular manner ; so that the plants in one line may be directly opposite to the interstices of the other, whence animals attempting to force their heads through any weak part of one line, are met in the nose, and repulsed by the opposite plant. These trees too, growing in concert, afford a mutual aid by sheltering each other, and will for several years grow faster than a single line.

Standards of all kinds are highly destructive in hedges, by hanging over, shade and smother the plants below them, and in all respects rob them of much nourishment.

Hedges that have grown any considerable time wild and uncultivated, must necessarily become ragged and open. To remedy this, the common way is to plash them ; and where they are not more than ten or twelve years growth, I have known them to become tolerable fences, when not too much wounded, (the common error) but when
done

done with skill and attention, and afterwards regularly clipped; but if they are not taken about that age, the severity of the wounds, necessary to make them comply to their proper stations, are so great, that in a few years many of them die, and becoming full of gaps, are more unsightly, and less fencible than ever; hence the advantage is of short duration, and the remedy becomes worse than the disease. But the only method of cure I can devise, and which I have often successfully practised for old overgrown Thorn-hedges, is to prune them close to their bodies, and cut them down smooth, with a slanting cut, to the height of about four feet, supplying the gaps with old Hollies, or strong plants of Sweet Briar, both of which ought to be divested of great part of their branches, which will make them push out most vigorously a great number of young shoots, resist the winds, and sooner become strong equal fences:

In supplying these vacancies, however, a little extraordinary labour and attention must be bestowed, in clearing away the roots of the old Thorns, and making the hole as large and as deep as the spaces will allow; in which, if some fresh soil is laid in the place of the exhausted earth taken out, you ensure success, and save time by having more liberal shoots, which will largely repay the expence.

To describe the various methods that have been practised by inclosing grounds with hedges and ditches, would be both tedious and unnecessary; nor would it be difficult to direct a yet greater variety

riety of ways hitherto unpractised, further than for making experiments; so that the few rules here recommended, as they are most natural and simple, so I have ever found them the most successful.

The following thirteen kinds of Thorns are worthy of being cultivated, in all good collections of flowering plants, where, from the beauty and fragrance of their blossoms in spring, joined to the rich glow of their fruits in autumn, they have a most chearful effect, properly disposed in the wilderness, or in groves near the house.

They are all, except the double-blossomed sort, to be propagated from seed, where these can be procured; but as some of them are apt to vary from the parent plant, when increased that way, I should rather advise their being grafted or budded on the common kind, from hence they will not only sooner become fruitful, but ever after continue to be so, wherein their greatest beauty consists.

The Medlars and Azeroles are cultivated, both for mixing with others in ornamental plantations, and for the sake of their fruit in the kitchen garden, where they are planted in standards and espaliers. They will succeed by grafting, or budding them on the common Hawthorn, but will be improved both in the size of the plant, and flavour of the fruit, by budding them on the Pear-stock. To enlarge the tree, a deep moist soil is necessary; but where fruit is the motive, a generous dry mould and warm situation is best.

Let

Let the stocks for the Thorn, when grafted or budded, be in a free-growing vigorous state, and about the bulk of one's finger, three or four feet above ground, which will be a proper height for these operations. The Pear-stocks, for the Medlars and Azeroles, must be proportioned to the uses you intend them: If for dwarfs, espaliers, or walls, graft them within three or four inches of the ground; but if for standards, the same height as on the Thorns will be best, as otherwise (they growing in a loose straggling manner) it will be difficult to raise them with straight clean bodies.

The *Pyracantha* or Evergreen Thorn is a trailing plant, and cannot be raised to a slightly standard, but is very proper for covering walls near the house, where the shining verdure of the leaves in winter, almost covered with large bunches of rich scarlet coloured fruit, is extremely beautiful. They are easily propagated from seed sown in February, in the same manner as the common Hawthorn, but in a shady border, part of which will rise the first, and the remainder the second spring, and these make much better plants than those increased by layers.

I have ever thought we pay too little respect to the common Hawthorn in our ornamental plantations, as, in the season of its bloom, I know few trees exceed it either in beauty or fragrance; I would therefore recommend it more for the wilderness work, as well as single plants in lawns, where a considerable number of them, judiciously interperfed with others, would highly decorate those scenes. The Thorn, unconfined, encouraged and

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in its natural luxuriance of growth, becomes a stately tree; and the wood, which is extremely hard, and finely variegated, particularly towards the root, is not inferior to Box for many curious and useful purposes.

CHAPTER XXXVIII.

On the PROPAGATION of TREES by
LAYERS.

THE manner of preparing mother plants or stools, from which you are to propagate trees by layers, has already been directed under the article of the Elm Tree. These directions having been observed, and strong clean shoots produced, early in October begin the operation, with all the hardy deciduous trees that are most proper to be cultivated in that way, and which are mentioned under their respective names. In the first place, cautiously bend down all the principal branches around the stool, without wounding them, if possible; let them be at such distances from one another, as to admit all the smaller collateral side-branches to be laid between them, and let them be firmly pegged down in the ground with hooked sticks, or otherwise, if the shoots are strong, the pressure of the earth alone will not prevent their starting up. If the principal shoots have no side-branches fit to lay, that is, if they are not about a foot in length, let all under that be pruned close away, and the main shoot be only laid; all the small twigs from the side-branches must likewise be cut close, or rubbed off, as the fewer shoots the layers produce, they will be the straighter and more vigorous. But before I direct the manner of covering them, I shall mention the different ways necessary to be practised with the branches, in order to force them to root.

Some

Some tie a piece of wire hard, round the twig, at that part where the roots are desired, and prick it in several places above the wire, through the bark with an awl.

When the wood is very hard and unwilling to root, the branches are sometimes cut by a slit upwards from a joint, as is practised in laying Pinks and Carnations, which is called by the gardeners tonguing the layers: But this severity I would seldom chuse to practice, as trees disposed to root by layers, may be prevailed on to do so by gentler means, when skilfully applied. The plants raised in that manner, are a long time recovering their wounds, and are very apt to be torn asunder when taking them from their mother plant.

Twisting the twig at the joint where the fibres are to proceed from, is often successful, but with several kinds of hard wood it does not answer; but with all the soft kinds it is an excellent practice.

There are other different operations performed in laying trees; but the specimens given are the best I know of, except one, which, though very simple, I have successfully practised during the greatest part of my life, and that is, scratching off the bark where the roots are wanted to be formed, deep as the wood, to about two or three inches in length, and two thirds round in stout branches, and less in smaller.

Having treated the branches in one or other of the ways described, proceed to lay them in the ground, by pegging down that part where you have made an incision, and with both your hands
press

press it into the earth, till it becomes sharp at the joint, as from it the stem must rise quite perpendicular; for if they are only bent in the form of a club, they will not by any future culture make stately or handsome trees. Let them be covered to about four inches deep, their tops cut down to two or three buds above the surface; observing, that from the extremity of the beds, they fall in gradually, surrounding the stool, hollowed within, in form of a basin, the better to contain the rains that fall, or the water given them by hand, which in dry weather should not be spared, as nothing will contribute more to their rooting abundantly.

It will likewise be proper to go over the layers about the middle or towards the end of May, to rub off all the buds and tender shoots except the most promising, as a great number of branches prevent the kindly effects of the rains and dews, and deprive the principal of its nourishment.

The autumn, as has been observed, is the best season for laying all hardy deciduous plants; for such as are delicate, the spring is a more promising season. If, immediately after the necessary operations, a hard winter might destroy them: For the very same reason, I prefer laying the tender Evergreens at that time also, rather than the usual seasons of August and September. But for the hardy kinds, I know no other season necessary to be observed, than that in which one can best spare time.

Though some little incision is necessary on the layers of most hard-wooded trees, yet in the Lime, and many other soft pliable plants, nothing more
is

is wanting than a proper covering, and attention to the other circumstances of general culture.

S O M E H I N T S O N P L A N T I N G.

By a P L A N T E R.

Printed at NEWRY, in IRELAND.

NO country would be more beautiful than *Ireland*, if its inhabitants were as fond of planting, and as careful of their trees, as the people of other countries; for surely we have here the sweet interchanges of hill and dale, and the most beautiful pieces of water to enliven the landscape.

Every planter should enclose the ground he intends to plant, with an impenetrable fence. The best of all fences is a wall built with lime and stone, a dry stone wall the worst. A ditch fenced with stones, and planted with four years old white-thorn, or holly quicks, and raised so high, that neither sheep nor horses may get over it, is an excellent fence, and affords a most hospitable shelter.

In vain do we plant trees, if cattle are suffered to get into our young plantations, or even into our full grown woods, for though they may not bark old trees, yet they will rub against them, and leave an oily matter on their stems, which by obstructing perspiration stop all vegetation.

The planter should not suffer rabbits to get amongst his young trees, for they will bark every one they can get at; the most effectual way of destroying them, is to lay for them parsley poisoned with arsenick

arfenick amongst the trees, when the ground is covered with snow.

Nor should the planter suffer any rooks or magpies to settle amongst his trees, for they will break off the leading shoots, and occasion the trees to become forked. Where Sallows will grow, the planter should set tall cuttings of them into the top of the ditch, net-wise, and they will soon form a strong fence, and shelter the plantation. Should the ground be too dry for Sallows, cuttings of Elder may be used, and broom and furze-seed sown amongst the cuttings.

I shall not recommend the sowing of acorns, or the seed of trees, or nuts, where they are to remain, for our soil is so much inclined to grass, that unless great care is taken, constantly to weed the young plants, this method seldom answers; and in large plantations, it is impossible to do it effectually, for oaks make but very little progress during the first three years, and therefore would require much weeding, but their roots strike down to a very great depth; I have measured the roots of four years old oaks that were above four feet long.

Another great objection to the sowing of acorns, &c. in open ground is, that rats, mice, and other vermin will devour the greatest part of them. I would therefore plant out three years old trees from the seed-bed, taking them up carefully with all their roots. These I would plant almost horizontally, and then cut their heads close to the ground.

Every planter should have large nurseries, made in the lightest and most sandy soil he has, and so contiguous that he may immediately plant out his trees
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without the danger of their becoming dry in the removal, but should he not have trees sufficient he should procure them from some nursery in his neighbourhood, where the soil is like the ground he is planting; he ought not to purchase trees from nurseries near great cities, as they are often raised on dunghills, and in an air much warmer than in the country.

The seed of the *arbutus* and other tender plants should be sown in boxes, that can be removed from place to place, filled to within eight inches of the top with Virgin Earth, then a layer of three inches of rabbit sand or turf mould, over this lay about two inches of rich light earth, on which sow the seed, but not too thick, then sift earth over the seed, and cover the boxes with nets, to preserve the seed from the birds.

Should the ground intended for planting be covered with shrubs, such as Hazel, Holly, or Black Thorn, the planter should make large holes between them, at about fifteen feet from each other; this to be done some months before planting, that the sun and air may fertilize the soil; be careful that the pits are made much larger than the roots, that the young shoots may not be injured, but pass readily through the loose mould.

Let such trees as are tall, be cut down close to the ground, to prevent their being shook by the wind, which is fatal to many new plantations, and though it may appear odd to advise the cutting down of a tall well grown plant, yet it is necessary, for as the roots must have been much bruised, and much hurted by the removal, it is impossible for those that remain to nourish the same body, which is the occasion we so frequently find newly removed trees

trees dead at top, and hide-bound, in which state they never can grow to timber; but should my directions be followed, such strong, vigorous shoots will spring up, as will in ten years become much larger trees, than if they had stood uncut for forty, and their bark as clean and sappy, as if they had grown there from the seed, and the planter save much, by not being obliged to bank them, or fix their heads to stakes, to prevent their being shook. I have measured the first year's shoots of trees, that were cut down when planted, that exceeded four feet, but great care must be taken that the first year's shoots are not covered with grass, or weeds; Oaks, Elms, Chestnuts, Sycamores, and Ash, thrive best on being cut down, but Beech not quite so well.

Such of the branches of shrubs as interfere with the young shoots, or shade them, must be cut away, which will greatly promote their growth. I do not find that trees grow any where so well as amongst shrubs, or are any trees so clean skinned; this may appear extraordinary to a young planter, who may naturally think, that they will draw too much nourishment from the Forest-Trees; but the great creator of all things, has wisely scattered the food of each plant over the face of the earth, so that many trees of different kinds will grow well on an acre of ground, when the same number of one kind would be starved. Every gardener knows that a Peach tree will not thrive, if it is planted where an old Peach tree formerly stood, though a Pear or a Cherry will grow very well there,

The planter should frequently visit his plantation, and when he finds a tree dead at top, or hide-bound,

he must cut it down as close to the ground as possible; and where a number of shoots spring from the same stock, all should be cut off but the strongest, and the spare wood cut close to the shoot. The planter should not suffer ivy to grow round his trees, as it spoils their bark, and cramps them in their growth.

The less Forest-Trees are pruned the better, particularly Pines and Firs. I never suffered any to undergo that operation, except when the stem became forked; in that case, the best shoot was preserved, and all others cut off close to the stem, with such side-branches as were too strong, and drew so much sap from the root as to prevent it properly expanding, for the greater encrease of nourishment to enlarge the trunk of the tree; the best soil for trees, is where the Hazel grows well. I do not depend so much on the richness of the soil for trees as gardeners commonly do, having observed most trees grow well in sheltered situations, and even on rocks. At *Killarney*, Oaks, Ash, Arbutus, &c. &c. grow to a great size, on rocks of lime and free-stone, where the eye can scarce discover a particle of earth; I have seen great numbers of the Arbutus there, that were above twenty feet high, in great beauty and vigour, growing amongst rocks, in barren ground. A Yew, which had grown in the joint of an immense free stone, and had cleft it, measured in the stem above eleven feet round, though the top of the rock was above seven feet from the ground, which was a poor barren soil.

A Holly in *Ennisfallen* measured eight feet four inches round; the Yew in *Muckrass-Abbey*, six feet six inches, and the height of the stem fifteen feet; a Juniper on a small rocky island, in that delightful lake, measured above five feet three inches in girth.

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The famous *Arbutus* at general *Cunningham's* at *Mount-Kennedy*, in the county of *Wicklow*, measured thirteen feet nine inches round, at one foot above the ground. I have had trees growing very well in a seemingly barren spot, which sheltered each other, while those I planted in single rows, in the rich earth of an old church-yard, have failed; from hence I find that shelter is the principal thing to be attended to in planting; but though I am so great a friend to shelter, yet I much dislike seeing trees too near each other, as their branches hurt each other, and their stems are drawn up to bare poles; no object of the vegetable tribe is so beautiful as a large branching Oak, with a fine stem: For this reason every spring, as soon as the air begins to grow warm, I direct such trees that grow too near each other to be cut down, it being the proper season for thinning plantations or woods, for trees most sensibly feel the alteration from heat to cold, and are much injured by it: many fine trees have gradually died away on their being deprived of their companions the beginning of winter, which exposed them too much and too suddenly to the cold; trees properly thinned, have all the advantages of growth, and will soon make amends for the space given them, both in respect of profit and beauty, while those that stand too close, (as has been observed,) only spindle to poles. The Pine and Fir, as their branches turn from the deciduous tree, should from the beginning have a large space given them to grow in.

Strong-rooted trees, such as the Oak or Walnut, will grow well in clay, as well as the Silver-fir, and the Balm of Gilead-fir, but the Weymouth Pine, and Spruce-fir, will flourish best in a light soil; nay, I have seen them grow well in a rabbit-sand;

but Scotch-firs are never out of place, they flourish in every soil, and in every clime, from the sandy plains of *Hesse-Darmstadt*, to the craggy mountains of *North Britain*; therefore, this convenient tree may be planted in our bogs or on mountains, and will form a beautiful covering for the tops of our highest hills: In this situation I doubt not, they will in time, grow to as good timber as the produce of *Norway* or *Sweden*. We are prejudiced against the Fir-timber of this kingdom; for what we have hitherto cut, soon decayed, not considering that even our Oak, (certainly the best in the world) if cut before its time, soon rots and decays. Our Fir-trees are usually planted in groves, in a rich ground, where they grow fast, are of course soft and spongy, and coming soon to a large size, the owners are tempted to cut them down, before they have had time to acquire any solidity; but were they planted in poor land, and suffered to stand to a proper age, or when cut down were steeped in water two or three months, or stoved, I doubt not, that our Fir would prove a lasting timber. This should now be attended to, as Fir-timber of the northern countries is encreasing in price every year.

I would not advise plantations of any of the Fir or Pine tribe, to be made of plants above four years old, for they are so fond of their native soil, as to be much checked if removed after that age. The Stone-Pine will scarce bear being moved, even at two years old, or having its roots touched by the knife, its seed therefore, should be sown in pots, out of which the roots may be easily taken untouched, when of an age fit to be planted out. As this tree grows on the *Alps*, in a much colder climate than ours, it should be propagated here.

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The Weymouth Pine grows fast, is very straight and consequently fit for the masts of ships. I bought some of them from the seed-bed, and contrary to the general opinion, I planted some in a light dry soil, amongst Hazel bushes, where they remained; the others I planted in two nurseries in walled gardens, one in a soil inclined to clay, well mixed with sea-sand, the other in a dry gravelly soil; of those that were planted in the clay mixed with sand, I lost about one third, and about one fourth of those that were put in the gravelly nursery; and not one of the plants set amongst the Hazels have failed; they continued much healthier, and have made better shoots than those in the nurseries, which were constantly dug about, and kept clear of weeds, when no other attention was given to those planted out, than to cut down the grass and weeds that stood near them, and trimming the Hazel as the young trees advanced and required air. From these and other observations, I find that the digging the earth about Pines or Firs, is very injurious to them, for however careful the labourers may be, yet they will often cut some of their side-roots, which prevents their thriving; and I am clearly of the same opinion in respect to all other Forest-Trees, for I find that the grass will keep their roots cool and moist in summer, and warm in winter, and is what nature intended as a preservative against the extremes of cold and heat, which is evident from trees growing so well in woods, and appear so clean barked; so that bushes, grass and weed, may be said to be their protectors. As to my Forest-Trees, I never do more than plant them carefully, fence them well, giving them all the protection in my power, from the chilling blast, and then leave nature to do the rest, and I have reason to think I have done well.

Sycamore will grow better in any kind of soil, in exposed places, or near the sea, than any other deciduous tree, and they are every day becoming more valuable, as our linen manufacture extends.

The Larix grows fast in light ground, and even on a mountain, its timber is excellent for house-building, as it will not soon take fire or blaze.

English Elms are so easily thrown down by high winds, that I am not very fond of planting them, except in the face of ditches along with the quicks, and they must be cut down at planting; but if they are grafted, or budded on the Irish Elm, they will withstand the force of any storm.

Chestnut Trees for bearing fruit, should be grafted or budded.

Most kinds of trees and shrubs will grow from cuttings, if they are planted in sheltered situations, at a proper season; cuttings of tender plants, should be set in a stove, or covered with bell-glasses, so that the air may not get at them for six weeks, or until they have put out roots.

The admirers of tender foreign plants, should have hot houses on purpose for them, but not amongst their Pine plants, or Melons: for as many of them are poisonous, it is impossible to determine how far the farina of their blossoms may affect the Pine-Apples or Melons that are near them. It is well known that the farina of Cucumbers, will spoil the flavour of Melons that grow near them. Gardeners should therefore be careful what trees or plants they set amongst fruit-trees, or plants for the kitchen use.

Trees

Trees that bear bad fruit, should not be suffered to grow amongst those that bear good.

Though the *Arbutus* and *Myrtle*, as well as some other tender plants, grow very well in this kingdom near the sea, yet they do not thrive so well in the inland parts; therefore, let the heads of these plants be watered with salt and water, on the first appearance of a frost. I recommend the same practice to be observed, when your trees are infected with insects, as I have found it equally successful.

Should the ground you intend to plant, be covered with shrubs of the aquatic tribe, such as *Sallows*, *Bog-myrtle*, &c. be assured that springs, or standing waters have chilled it; therefore, let deep drains be made to intercept the springs, to carry off the water before you begin to plant any trees of value; but should it not be worth the expence to accomplish it, make your fallow-beds there, which will turn to good account; of all the fallow tribe, the *Chesnut fallow*, or *Scented Willow* is the best for basket work, or for hoops, as it produces the toughest twig of any of the *Sallows*.

The red *Sallow*, and the *Gorgomel*, are the best for timber, or for sheltering plantations, as they grow fast; and here I must recommend the propagating of them for their bark, as we are obliged to import a great quantity every year; and we have immense tracts of bottoms that are now of little use, that might be made very profitable at a small expence, by putting down in spring cuttings of those *Sallows*.

The black *Poplar*, or *Cheshire Willow*, is of a quick growth, and will grow very well from cuttings;
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the *Carolina* Poplar and Pine-Poplar, may be grafted or budded on the young shoots. I have been informed that the timber of Poplars and Sallows, is very fit for making broad wheels for carts or cars, as it will hold the nails well, and is light.

Oaks will grow well in a swampy soil. I have seen many thrive well, notwithstanding they were covered every winter, by the overflowing of a neighbouring river, but their timber is not so good as that growing on a dry soil.

Grass-grounds, that are intended for plantations, should be fallowed, and trench-ploughed as deep as possible, when this is done, the ploughman is to go as deep as he can with his plough, another is immediately to follow, and to cut as deep as possible in the same furrow, but with an higher earth-board, to cast the earth over, and bury the sod ; which as soon as rotted, the ground must be ploughed again ; for the deeper, the finer, and the looser the earth is made, the better, the young plants will spread their roots in it.

Stiff clay must be mixed with sand, or limed to open and warm it.

Should the ground that is intended to be planted, have been under corn the last season, nothing more is necessary to be done, than to trench-plough it as soon as the corn is off, when it may be planted, for the stubble will open the soil and keep the roots warm. I would plant the ground thus prepared, with Oaks of three or four year old, at about twenty feet from each other, and all others between the Oaks, but not in straight lines, as that form draws the wind too much, and would chill the young trees ; the deciduous
trees

FOREST - TREES. 283

trees must be cut close to the ground; the most exposed trees of this plantation, should be Sycamores and Scotch-firs, as they grow fast, and will soon shelter the others. Hazel-nuts, Broom-seed and Liburnam, may be sown through the plantation in spring, and Junipers, Holly and Laurels, planted there for under-wood, and covering for game.

The Autumn is the best season for planting trees, and that as soon as their leaves begin to turn; for we in general have so much dry weather in spring, that it would be impossible to preserve them by watering.

The best method to be followed, for planting trees in bogs, is with a setting stick, nicked at the end, for the root to lie in; the planter must be careful to press the bog well round their roots.

Not any thing more necessary for an orchard than shelter, as well as to all the different works of Nature, even the human species frequently experience its fostering influence, and are experimentally taught its value, in this uncertain climate. To bring an orchard as early as possible into profit, plant Crabs or Wildings, of four or five years old, to be cut down as soon as planted, and on their young shoots graft or inoculate the best fruit you can procure; from this practice you will have more fruit in ten years, than otherwise in twenty. The Wilding, so necessary for the Cyder maker, if grafted on its own stock, will likewise come much earlier into bearing, and the fruit much improved for use and size.

Notwithstanding the act of the 5th of George the third, gives great encouragement to planters, yet I fear this kingdom will never be well wooded,
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or improved, whilst our Roman Catholicks are precluded from taking land for their lives; surely this is bad policy, for their being possessed of a permanent property, would be the best security to government for their good behaviour, as they would then have something to lose, but the contrary in the present policy. The man who is so happy, as to have his farm and improvements secured for life, will exert himself to improve them; but the wretched tenant who knows not the hour he may be dispossessed will not improve, lest his labour should be for the advantage of another. He never feels the joy of being at home! Which is a happiness I sincerely wish to every Irishman, whether he prays to his creator in English or Latin.

Such as have a desire of putting into practice, what has been strongly recommended by the late writers on planting of timber trees, are to observe, that the proper season of cutting down the *Oak*, *Elm*, *Chestnut*, *Sycamore* and *Alb*, and others, as particularly recommended in this treatise, is, in the month of *February*. The progress that trees have made after this operation, are known to be such as far exceed any other, as a first year's shoot has been found to exceed four feet, with every appearance of health and vigour; the shoot made is to be attended to, to remove any obstruction of weeds or grass, while coming up; trees that are stunted in their growth or spindle too much, as well as those that are hide bound, or require their roots to be encreased, for the better proportioning their stem, or to give them a sufficient hold in the earth, to withstand tempestuous winds, are recommended to be treated in this manner. For particulars the treatise is requested to be consulted, as this practice is not universally, tho' generally recommended.

C H A P.

CHAPTER XXXIX.

ON GRAFTING AND INOCULATION.

OF all the aids Nature has received from Art in the productions of the vegetable world, none has perhaps been more astonishingly great and useful to mankind in the improvement of gardening, than what has been derived from the culture of trees and the improvement of generous fruits, by grafting and inoculation. By this happy discovery, we can not only preserve every species bountifully bestowed on us by the great Author of Nature, but improve them, which by sloth and inattention, if not lost, would so degenerate as not to be worth preserving. Those that we raise from seed, we have the same opportunity of improving by these helps.

I shall therefore mention the different ways of grafting that are or have been usually practised, as, each may be useful in certain circumstances, and it is incumbent on me to point out and direct the different operations. But before we proceed to execute, let us be provided with the necessary materials, which are as follow :

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The grafts of all hardy trees should be cut *three* or four weeks, and laid in a shady border six or eight inches deep, before they are used: Such, as the gardeners call *thirsty grafts*, are ever found to unite sooner, and more certainly, than when the circulation of the sap is equally brisk in both the graft and stock; and I never had more success, than with grafts that were so much shrivelled in the bark, and seemingly withered, as to be thought only fit for the fire by such as were unskilled in the art.

Where your stocks are strong, that is, not less than half an inch in diameter, a stout stumpy graft with thick-set plump buds, is more to be preferred to a slender one, for the luxuriant growth of all hardy Forest-trees; but where blossoms and fruit are soon desired, or the trees intended for a dwarf, the reverse must be observed.

The grafts being cut and made ready, their covering ought next to be prepared, by collecting a necessary quantity of strong, fat, loamy clay, to which add a fifth or sixth part of new-made horse-dung, mixed with some hay or straw cut very small, which will bind the whole well together, and prevent its rending and falling from the trees. These materials must be well blended, by often beating, and pouring water on them every second or third day, till they become solid and well incorporated; after this the whole should be hollowed in form of a dish, not exposed to frost or drying winds, but kept moist by regularly pouring water on it until it is used.

The instruments necessary for the different operations are:

1. A small

1. A small hand-saw, to cut off the heads of large stocks.

2. A good strong pruning-knife, with a thick back, to make clefts in the stocks.

3. A small knife, made very sharp, to cut the grafts.

4. A grafting-chisel, and small mallet.

5. A wedge, to keep open the clefts in large stocks until the insertion of the graft.

6. Some bair mat, or woollen yarn, cut into proper lengths to tye the grafts to the stocks.

Since the first invention of grafting, there has been many various ways recommended for performing it; but the following has been found the best, and most successful:

1. Grafting in the rind, or Shoulder-grafting, which is only proper for trees two inches diameter or upwards.

2. Cleft or Slit-grafting: This is proper for stocks from about three quarters of an inch to two inches diameter.

3. Whip or Tongue-grafting: This, for stocks not exceeding three quarters of an inch diameter, is most readily performed, and by far exceeds most of the other methods. By whip-grafting, the wounded stock soon heals, and where the growth is vigorous, in two years the stock and graft become

come so perfectly united, that one will hardly discover that any incision had ever been made.

4. Grafting by approach, inarching, or ablactation : This is to be performed on plants in pots, or when the stock you would graft on, and the tree from which you take your graft stands, or can be brought so near together that they may be joined : But inarching is only proper for tender exotic plants, as from this operation they never become vigorous hardy trees, though, to bring forward the sudden production of flowers and fruit, no practice has yet been found so successful ; and you may even inarch trees with the blossoms and fruit upon them, but this is committing violence, for it is better to allow an intimate conjunction, by a free circulation of the sap, before you admit of their bearing any quantity of fruit at least, which considerably impairs the strength of all new-planted or new-grafted trees. This method of grafting is to be performed three or four weeks later than any of the others, and when the juices are in high circulation.

5. Grafting in the root : This is of much later invention than any of the former, and, in many circumstances, may be an improvement on them all. It is performed by cutting the clean smooth roots of the stocks in pieces five or six inches long, and as large, or a little larger, than the graft of the species you are to unite : Let them be whip-grafted and tyed together very close, so as to prevent the wet from affecting the wounded parts, and plant them so deep, that the graft, which should be four or five inches long, may be about one half buried under the surface. This is an admirable practice, both for improving the flavour

vour of fruits, and preserving a nearer similitude to the tree from whence you take your grafts; for by this method the grafts will root, and these roots increase as well as those from the stock; and as all plants draw much from the stock on which they are grafted, these will have a less dependence, having a great part of their nourishment from their own proper roots. From this circumstance I must observe, that I can see no manner of difficulty in making the grafts as genuine a species as the original tree from which they were taken, by cutting away the stock, as soon as the grafts have stood two or three years, in which time they will have sufficiently rooted to admit of a separation, and succeed by themselves. This hint may assuredly be improved to much advantage, and is only making the stock a temporary nurse until the graft has acquired strength. Where this method is to be put in practice, the grafts may be an inch or two longer than those already directed, as, by giving them that additional depth in the earth, they will the sooner and the more abundantly root.

The season for grafting must be regulated according to the state of the weather in the spring, earlier or later as that shall be more or less proper. The usual time of performing it, is when the buds begin to swell, which no doubt appears very consistent; but as at this season we seldom have a continuance of mild weather for several weeks, I have in my earlier days often paid very dearly for my compliance with this common and seemingly proper time for the operation, both from a continuance of cold rains, and sharp withering frosts, and that even after the grafts have begun to push out their shoots with some vigour, hence I have frequently had whole quarters cut off: Therefore,

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from as much practice in grafting as perhaps any one man of my age has had, I advise, that the grafts, particularly of hardy free-shooting trees, be cut and laid in the ground before their buds begin to swell; and advise the operation to be delayed until the circulation of the sap is brisk in the stocks, and their buds begin to break into leaves, when the grafts will immediately unite, which if done earlier, would not be the case; for being now advanced in the season, we have a greater assurance of a continuance of milder weather. It must be observed, that the shoots of tender trees will not admit of being so long cut before they are made use of, as the more hardy.

Let it ever be a standing rule, not to graft while it freezes or rains; in either of which events, no reasonable success can be expected.

It has lately become a practice, as soon as the grafts are tied with bafs, and without any application of the clay, to hoe up the earth so deep as to cover the stock; in this way, I have succeeded with hardy trees, in a dry mild spring: But in this country we have of late years been so little acquainted with these temperate seasons, and I have suffered so much by a too sanguine hope of better weather, that until I find some alteration in our climate, I shall neither advise others, nor venture myself, to do any thing in this way without taking every precaution, but when hands sufficient to accomplish the business seasonably cannot be had. I recommend, that your grafts be tied as firm as may be, without galling them, that the wounded part of the stock be intirely covered with the bafs, and that the clay when well tempered,
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be put on smooth and close, fully covering the base, and top of the stock, in such a manner as will best keep out the air, and prevent all other injurious effects to be apprehended from cold and wet.

Inoculation or budding, is a species of grafting infinitely superior to any other yet invented for most kinds of trees, and will succeed with many sorts that will not agree, or make good plants, by any other method. From this practice of only opening about an inch of the bark, and gently thrusting in a small bud between that and the wood, there is not the smallest violence committed on the stock, which, being done in the growing season, in two or three weeks becomes perfectly sound.

This operation is commonly performed from the middle of June until the middle of August, a little sooner or later as the season is more or less forward: But the best rule to be observed, is to begin when you find the buds fully formed at the extremity of the same year's shoots, at which time they have finished their spring growth, and are ripe for inoculation.

In very hot dry summers, particularly in light thin ground, the bark of the stocks will not easily separate from the wood, owing to a stagnation of juices: To remedy this evil, two or three weeks before the season for budding commences, let the stocks be regularly watered every third or fourth evening; and if some are sprinkled over the tops, from the rose of the watering-pot, in imitation of Nature's watering, it will contribute much to invigorate them. This too may be very successfully applied to the trees from whence the buds are to be

taken ; by not knowing or attending to this, I have frequently seen the buds of an entire quarter perish, and others where the stocks were so hide-bound that the bark would by no means separate from the wood to receive the bud. A watering or two after the buds are set in, will likewise be of use.

The best time for budding is in cloudy weather, (though not when it actually rains) or in the evening of a warm dry day ; for should it be performed in the middle of the day, the shoots will perspire so fast as to leave the buds destitute of moisture.

Budding is preferable to every other operation for all kinds of stone fruit, as from the other methods of grafting, they are very apt to produce a gum in the wounded part, with which, if the plants are ever so little infected, they never shoot freely, or live long. It is likewise best for most of the nut-bearing trees, many of which will succeed in no other way, or by inarching, and which, as has been observed, is rather an amusing entertainment than any real improvement.

The manner of performing the different operations of grafting, has been already so well described in books on Gardening, as to render it unnecessary for my giving a particular detail of the different ways of doing them, and the more so, as they are most accurately and distinctly given in Sir James Justices's Piece on Gardening, illustrated with engraved representations of the cuts and forms of the stock, the manner of preparing the scions and making the incisions, the better to convey the manner of the execution, which will greatly assist the young practitioner.

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Every gardener should be early instructed in the theory as well as the practice, as the first elements of his profession; for simple as the operations may appear, I never knew them readily and successfully executed by any who had not begun early in life; I therefore advise all young and unexperienced gardeners, to apply themselves as early to the practice as possible, consulting the writers on the subject, as well as procuring the assistance of an able master.

The stocks on which the different kinds of trees will best succeed, and others by which their species will be improved, and their fruits meliorated, are already mentioned in the culture of the different trees.

✧ The method of grafting in the root, militates strongly against the opinion, that fruits are refined and rendered more delicate, as well as enlarged by grafting on the stock; it has ever been considered as setting one tree in another, in which it extends its fibres, receiving its nourishment from the tree in which it is planted, after it has been refined, in passing through the several conduits of that set in the earth, from which it is fed with the coarser food; but it must be observed, that this only respects Timber Trees.

C H A P T E R X L.

On **FORESTS** and **WOODS**, and the most successful as well as speedy manner of **PLANTING** them.

TO plant a wood without inclosing, is not only amongst the idlest ways of throwing away money, but is laying up a fund of remorse and discontent that will necessarily follow, from the devastations of cattle and sheep, whose browlings and bitings communicate a poison to the trees, which nothing but cutting them below the infected part can expel. Let this then be your first care to perform in the most substantial manner, with double ditches or hedges, in one or other of the ways directed, according to the situation and quality of your ground.

Though the advantages are great, which the estates in England have over Scotland, owing to their growth of timber, yet we are certainly less attentive to the culture of woods than any other improvement. But as I believe the increase of them, particularly in the cold, barren, and less cultivated parts of this kingdom, will be of the utmost importance, remove many obstructions, and pave the way to a general and successful husbandry of various kinds, I shall endeavour to give some hints, which, if attended to, will, I am certain, much forward the growth of the plantations,

ons, and procure them in many quarters where experiments have already been tried in vain, but not conducted judiciously, or on proper principles.

Where the soil is of a loose sandy quality, the trees must necessarily be planted in pits, as, by breaking up the whole surface, many of them would be blown out of the ground, and others buried by the driving of the sand, where the situation is exposed. With respect to such soils as are sufficiently compact not to be driven by the winds, however pitting in such may be recommended, yet I must dissent, and insist such should be well fallowed and pulverised, by frequent ploughings and harrowings; grounds of a middling quality, that have been under grass, will require a summer and winter's labour at least; an obstinate clay, not less than two.

Neither is the extraordinary expence of cultivating this ground so great, as might at first view appear without including the future advantages attending it. The pits in old, hard, uncultivated land, must be made three times as large as on that which is dressed, and ought to have a good deal of loose earth laid in to place round the roots, otherwise, in wet seasons, the water will stagnate and rot the fibres; and in a season or two so obstruct their progress, as to become stunted and hide-bound, from which they slowly recover, and that but seldom until they are cut down; whereas, in the other situation, the pits need be made no larger than easily to contain the roots, as they will proceed in their growth, and spread their roots near the surface without interruption.

on. However, if planting the ground in its natural state is determined on, let the pits be made the preceding spring, to correct and meliorate the founness and obstinacy of the soil ; and if you can procure a mixture of more generous mould, and of an opposite quality, let it be mixed, and often blended together with that taken out of the pits, as soon after as may be. In planting after this manner on stiff or wet land, be careful that the trees are not planted deeper than barely to support themselves against the winds, and that the pits may be dug considerably broader for their depth, than the usual proportion allowed in a loose dry soil.

For a century past, the Scotch Fir has been the common nurse of all the better kinds of Forest Trees in Scotland ; and he must be both ungrateful and ignorant, who is insensible of the many and great advantages this country has reaped from the general culture of this plant. Without the shelter of this fostering Tree, we should never have seen plantations of the Oak, the Elm, &c. in many almost barren, and exposed situations. However deserving of attention, the Scotch Fir may be for the purpose of planting, yet I must be allowed to mention other trees, that will answer the purpose as effectually in ten or twelve years, as they do in twenty, and that by an easier and cheaper method, than even the small one of raising them.

The plants I mean to substitute in the place of Firs, are the different kinds of Poplars, and the large Maple, in Scotland commonly called the *Plane Tree* : They are of an infinitely quicker growth than
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the Firs, and they can be planted of a considerable size on the poorest lands with safety, and of course will sooner give the advantages that are so necessary for young plantations.

I have long thought we are more alarmed than hurt, by the common apprehension of hard winters being so generally baneful to our hardy deciduous plantations, and believe that then only, the shelter from Firs or other plants is most materially useful. That we have seen two or three winters which have hurt hardy plants when young, or newly planted out, must be acknowledged ; but the case is far from being common, and for one loss of that kind, we have sustained many more by the violence of the winds in the summer months, when the trees, pregnant with their juices, and loaded with leaves, are so heavy as to yield to the tempest, the roots at that time being an unequal balance to their bodies, hence these roots are often torn asunder in the growing season, and bleeding much, are apt to canker, and slowly, if ever, recover ; which, in the most violent winter storms, is seldomer the case, when the plants, being much lighter, firmer in their shoots, and divested of their leaves, less oppose themselves to, and are more rarely conquered by the winds.

It has already been mentioned, that the trees for plantations must be adapted to the different soils on which they are planted ; and this cannot be too much enforced, as it requires the greatest attention and judgment, in order to adapt properly the various soils and situations of your intended wood or forest, to the plants intended to be set in them, in which, I am sorry to observe,
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we have hitherto been extremely defective. Notwithstanding what has been directed in this treatise on the culture of the different trees, where treated of, it may not be amiss to repeat some of these particulars, in order to render what is here directed, more readily understood.

I cannot help observing, we betray a general want of taste in the disposition of our woods, as in few of them any regard to elegance or beauty is considered, and which, if we did, would not add any thing to the expence. Why then may not all our plantations be diversified with walks, as various as those in our most adorned wildernesses? This, though not so sprightly and chearful a scene, would be a no less magnificent one than the other, and as agreeable to many rural tastes: At the same time, I should be ashamed to appear insensible of the pleasure resulting from a well-planted wilderness kept in fine order, and decked with its charming variety of hues. The free circulation of air in these walks and alleys would be communicated through the different quarters, render them more healthful and vigorous, and prevent many mortal diseases incident to large and crowded plantations, by a suppression of the damp vapours, which creates a mouldiness hurtful to the plants, and contaminates the air itself: Besides, were these walks, well ploughed, fallowed, and laid thin, would, from the great quantity of leaves they would be covered with, soon produce good grass.

The best season for planting the light grounds, is as soon as possible after the beginning of October; for the moist and heavy, in February and March.

March. At these periods, your ground being previously prepared in one or other of the ways mentioned, and staked out in the figure you chuse, proceed to plant as follows :

If the ground is to be laid out in the wilderness way, let every quarter be bounded by a row of Poplars, at two, or two and a half feet asunder ; in the heaviest and wettest places, let them be of the Lombard kind, and in the thinner and lighter, of the white, which, of all the species, will make the quickest progress in such soils ; and, in order to make them yield a speedier shelter, by growing close, let them be pruned or clipped in the sides for two or three years. These Poplars ought to be planted, either rooted, or from cuttings four or five feet high, if such can be conveniently procured, or as near that size as you can. If the whole ground is to be planted, without being divided by walks, after going round it as mentioned for the quarters, let lines of Poplars, running from south to north, be planted at about an hundred, or, in very cold exposed situations, at eighty feet asunder.

The next thing to be attended to, is that the disposition of the Maples be such as will best promote the growth of the more valuable trees ; for this purpose, I think every second line ought to be of them, not next the Poplars, which will sufficiently shelter whatever is immediately near them, but amongst the trees intended for timber.

The distance of the trees over the whole plantation, (the bounding and dividing lines of Poplars

lars excepted), I think, ought to be five feet every way ; for whatever the advocates for very close planting may advance, the consequences arising from it, are generally more fatal, than erring in the opposite extreme. Plants may be too much crowded, or, what the gardeners call *drawn*, as well as too much exposed; the latter evil is provided against by the shelter of the Maple and Poplar trees, with that they mutually communicate to each other.

Having planted one half of your intended Forest, (free from standing water,) with Maples, in rows ten feet asunder, and five in the row, consult the nature of every spot in it, that the more valuable plants may be disposed of in the soils they most delight, which, in general, I take it to be as follows :

In the most generous, deep, but dry soils, the Walnut, with English, Scots, and Cornish Elms; in the moist and heavy, the Dutch Elm; in coarse and stoney, the Chestnut and Ash; in light and sandy, the Larch and Beech; and in clays of all the different qualities, tho' swampy and mossy, the Oak. These are the soils most universally prevailing in Great Britain, and those the trees nature seems best to have fitted for them. They are also of the greatest value, and most general use, tho', if a little ornament and variety is wanted, a small mixture of the hardy American sorts may be added; but profitable returns being the principal object of this Essay, to that I chuse, in a great measure, to confine myself.

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Where the soils are very different, and the trees adapted to that variety, an extensive plantation, diversified with groups in different quarters, will appear far more chearful and picturesque, than one uniform wood of the same kind of trees.

A Forest, planted in the manner I have here described, should be of a continued flat, at least one not broken with rocks, for which reason, I have been altogether silent in respect of the Scotch Fir; but in mountainous rocky situations, the Poplar and Maple will not succeed, for want of a sufficient depth of earth to cover their roots at first planting: In such places, perhaps the Firs are the greatest improvement that can be made, planted not above three years old, when, after two years more growth, Oaks and other trees may be interperfed wherever the land will receive them. The culture of the Scotch Fir then, so far from being discountenanced, should, with the greatest propriety, be rather increased; as there are still, in most parts of Great Britain, more large tracts of mountainous, poor, and otherwise yet unimproved surface, than the greatest industry of several ages will probably overtake, which may be covered with these plants. But I shall now proceed to the ages and sizes of trees best fitted, in forbidding soils and situations, to make our Forest flourish.

Some have asserted, that the best manner of rearing woods, is by sowing the seed on the spot. But of this I cannot approve, for several reasons: For besides the great expence, length of attention, that is required before the plants can be left to
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nature, the ground must be as well prepared, kept as clear of weeds, the land about the plants as regularly dug, and in all respects as well cultivated as the nursery. It is but a small proportion of the plants produced from the seed, that can remain in the wood to become trees, while the superabundant, which must be taken away, have injured those that remain, and makes much against this practice.

I am therefore against raising a Forest, after this manner, except with the Walnut, Chestnut, Evergreen Oak, and a few of the other nut-bearing trees, that do not easily remove, or grow freely after it, and even of those only where timber, without any regard to fruit, is the object; in this case, such are preferable to the best cultivated plants, where the land is not extremely bad.

Most gardeners are for planting seedlings of two years old, as the most hardy, and likely to succeed, in our barren, cold, uncultivated soils. This practice, however universal, and long sanctified by custom, has no weight with me, as, from many trials, I have found it absurd; and I cannot help declaring, I think it both against nature and common sense, nor can I in any other way account either for its beginning or continuance, than the bad culture too generally given to our trees in the nursery, after they have been removed from the seed-bed, as they are dibbled in without a proper reduction of their roots, so as to encrease and properly extend them, and are generally crowded so thick together, as soon to become much worse than good seedlings, having
hard

hard carrotty roots, without fibres to feed them, and tall slender bodies, unable to bear a gentle gust of wind.

I presume no experienced gardener will deny, that seedling trees in general have one downright top-root, with few small roots or fibres, in comparison of such as have been transplanted, and their roots shortened, and repeated at proper periods; this will not only increase the roots, but render them hardy, by change of food and situation. As this is the case, it appears to me ridiculous to assert, that a young tender plant, just taken from a warm seed-bed, is sufficiently hardy to bear being exposed to a bleak situation, and a cold uncultivated soil; it may with equal justice be said, that an infant from the breast should be able to bear the inclemency of the seasons, and live and thrive with coarser food, and less shelter, than a child that has been properly nourished for some considerable time, and inured by degrees to a variety of changes.

The analogy between the animal and vegetable creation, which in many circumstances greatly resemble, confirm what I have asserted, nor is what I have advanced a speculative notion; but to exemplify it, I shall mention the following experiments, and which I have repeatedly made:

I have sown the seeds of Forest Trees on the poorest ground, planted seedlings, and strong well-nursed trees, from ten to five feet high, on the same ground, when the old cultivated plants have frequently made sightly trees, the seedlings

lings have perished, and, from the sterility and coldness of the soil, the seed has not so much as vegetated. In short, the mouths of seedlings are not so well fitted as larger plants, to draw nourishment from crude, rank, and uncultivated soils; and, as I have repeatedly found in many instances, what is here said to be the case, I am obliged to believe, that the general practice of planting seedlings in poor, and larger trees in good land, should be reversed; but still attending to this most essential and indispensable circumstance, that the large plants have been removed as directed, and otherwise properly cultivated.

Having then planted your well reared trees, and rejected both the sowing of seed, and planting of seedlings in your wood; I would advise their being four or five years old, that is, to have been removed at the proper times already mentioned from the seed-bed, and cultivated in the nursery two or three years, more or less according to their kinds, and the quality of the ground whereon they are to stand; with such finish your plantation, in the manner, and at the distances directed for the Maples. Those trees will be able to get the better of all weeds, but a few of the large-growing sorts; and the land may be cultivated by hoeing in summer, and digging in the autumn and spring months, or not, yet should this be continued for three or four years, with the necessary care, that is, of not injuring the horizontal fibres that approach the surface, when the more vigorous growth of the trees will soon amply repay the expence.

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When these plants have stood four years, but not longer, take away every second Plane, and, in two years more, the remainder of them, with every second tree of the other kinds, which will leave the whole plantation at ten feet asunder.

The trees raised cannot be lost to a person who has any considerable extent of land, few large British estates being yet too much crowded with wood over all parts of them. They may be planted on the farms in hedge rows, and many various ways to great advantage, and would cost a great deal of money from a nurseryman; so that the expence of this plantation ought not to be grudged, having effected two of the most capital points on any estate, a thriving wood; and a good nursery.

From this time these plants will require no further trouble, than pruning away the ill-placed superfluous branches, until they bring money, which they ought to do in eighteen or twenty years from planting, at which time three-fourths more of the remaining trees, and all the Poplars, must be taken away, which reduces them to twenty feet asunder; and when the value of the timber, cut for country uses, will certainly exceed both the expence of labour and rent of the ground, much more than any other crop will; besides, the trees, at these distances will not hereafter prevent the ground from yielding good pasture, and the value of the plantation, for fifty years afterwards, will annually increase in greater proportion than before.

Though I have mentioned the whole trees in this Forest to be planted the same season, yet if the nursing ones, which are soon to be taken away, were planted a year or two before the others,

particularly in very bad soils, and exposed situations, it would, in place of losing, be gaining time, as, from their immediate and extraordinary shelter, the better trees would have little check from the winds the first season, which when they meet with in a violent degree, often keeps them at a stand for several years. It is therefore of the greatest consequence, that every possible assistance be given them, to encourage a free growth at being first planted out.

Notwithstanding of warmly recommending shelter at first planting, as the most probable means of soonest procuring a flourishing plantation, yet I must no less recommend attention in taking away the necessary proportions, where too thick, seasonably as they advance ; from which neglect, I have often seen many extensive plantations of noble Oaks ruined, by being overhung with Scots Firs, which not admitting a free circulation of air, they have been drawn up to the most disproportioned heights, and this misfortune nothing but cutting down will effectually cure ; but the different periods here directed for thinning them, will generally answer your intentions.

From the late and now universal taste in all new and expensive designs in the garden way, of throwing a large extent of ground about the house into lawns of grass, many fruit-trees, which in former times generally grew in the kitchen garden, and these gardens adjoining to the house, are now destroyed, from whence common fruit has risen in price to the full proportion of every other article in life. I cannot therefore but believe, that an orchard, which, sensibly planted, will little or not at all impede the growth of grass, corn, and other

other vegetables, would soon become the highest improvement the lands in this country are capable of receiving : But a dissertation on Fruit-trees being foreign to the present subject, I only mention, that if some of the most favourable quarters for fruit were inclosed, and planted with strong well-cultivated trees of them, in fourteen or sixteen years, every tenth acre of the orchard would certainly pay the whole expence laid out in our Forest, and lay the foundation, without further expence, of an estate, increasing considerably for ages. Apples and Pears, the most certain and profitable standard fruits, will succeed in land of any tolerable depth, though coarse and heavy, having been exposed and meliorated by the winter's frost and summer's sun.

C H A P T E R X L I.

On making TREES FIT FOR REMOVAL, that
have stood uncultivated and too thick in Nurseries or Woods.

THOUGH the longest experience, and most extensive knowledge in planting, will not for many years, if ever, bring overgrown unremoved trees to the comely figure and luxuriant growth of those that have been reared from young plants, according to the preceding directions, yet, where one cannot procure such, and have of the former, they may turn them to account, and soon make a figure in a bare field, or about a new-built house.

The trees worthy of this labour ought not to exceed fourteen or sixteen years growth, or from twenty to twenty-five feet high, as, if older, in general the cutting of either their roots or bodies will be doing them a violence they will never recover so perfectly as to become handsome trees, but ever continue in a spreading bushy form.

The sorts to be treated in this manner, are the different species of Elms, of which the English, as the most aspiring, and that soonest recovers its wounds, is far the most proper. The Lime will bear this operation at a great size, soon heal, and afterwards may be formed with ease to any shape you please : The Ash and Oak will likewise admit
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of cutting well enough at the ages mentioned, but these ought to be cut higher in proportion to their bulk than the former, and where the bark is smoother and thinner; from whence the shoots will be fewer, and rise in a more perpendicular direction. In this direction, and in the strength of the branches, they will be much assisted, by rubbing off all the tender shoots, but one or two of the most erect and vigorous, from the beginning till the end of June.

The Beech, the Platanus, the large-leaved Maple, the Hornbeam, the Sweet Chestnut, the Horse Chestnut, the Poplar, and the Laburnum, will also bear being reduced in height, but will not afterwards grow lofty, or in the pyramidal form, but, in detached trees, on lawns, or other grazing fields, may make graceful spreading plants, and afford an agreeable salutary retreat for men or cattle from the scorching summer heats.

The first step to be taken in this business, is, to mark out what trees (if any) you intend should remain on the spot, as also those you mean to remove for planting again, leaving them at such distances, as that there may be sufficient bounds for making a deep trench round each plant for undermining them the following season. This being done, in autumn grub out by the roots all the others, and trench the ground at least three feet deep, of whatever quality it be, which will encourage many spreading roots from the sides, and better prepare them for what is to ensue. Early in the succeeding spring, cut your trees over at a suitable height, a good deal slanting, immediately above where buds are, or branches have been, and rub over the wound with pitch, or cover it with a plaister of clay mixed

mixed with horse-dung, such as has been directed for grafts. It is impossible justly to ascertain the height these trees should be reduced to, that depending on their proportions, as the strong-bodied plants must be cut higher than the more slender of the same height. I shall suppose them, from standing very thick, to be drawn the length of twenty-five feet; in that event, cutting them from twelve to fifteen feet high may probably be about a proper medium, but the precise standard must depend on some little knowledge in the operator, or rather director, as indeed the wounding or pruning of trees of every kind, and for every particular purpose, ought not to be left to the barbarity of common labourers, but have more attention bestowed, and gentler treatment given them, than they usually meet with.

The general practice in cases of this kind, is reducing both the tops and roots of the tree at the same time: But this is a severity they will not bear; for though they may outlive it a few years, it will be but in a consumptive way, from which they never fully recover: Therefore, to do this effectually, two years more must at least be employed.

The following spring then, make a trench between three and four feet deep, and full four feet wide, round all the plants to be removed: Bend the tree so far to one side, as that you can come easily at the downright roots; after which, with a sharp hatchet, cut them across, but leave the side-roots, particularly those nearest the surface, as little disturbed as may be: This being done, replace the plant in its former upright station, and throw back the earth taken from about it.

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FOREST - TREES. 311

A year after, open the same trench, and shorten all the spreading side-roots, which will much increase their number, and make the earth adhere to them when the trees are raised for good, and which they may be the succeeding season, but it will still be better if they remain another. It may naturally occur, that if any of the trees are to remain, reducing their overgrown heights is all that is necessary to be done with them.

The reason of taking two or three seasons for preparing these roots in the manner directed, is, that the strength of the trees may be as little impaired as possible, particularly such as you intend to grow lofty in the pyramidal form, which, when all the wounding operations are performed at once, they cannot do, as the shoots, from weakness, will not grow perpendicular, but loose and straggling, though, by using these precautions, and having this patience, which in the main is losing no time, the upright shoots will be straight and vigorous before the trees are raised, and, being furnished with plenty of young fresh roots, they will rise with bulks of earth about them, and continue in a healthy state.

For the best manner of planting these trees, see the ELM.

F I N I S.

